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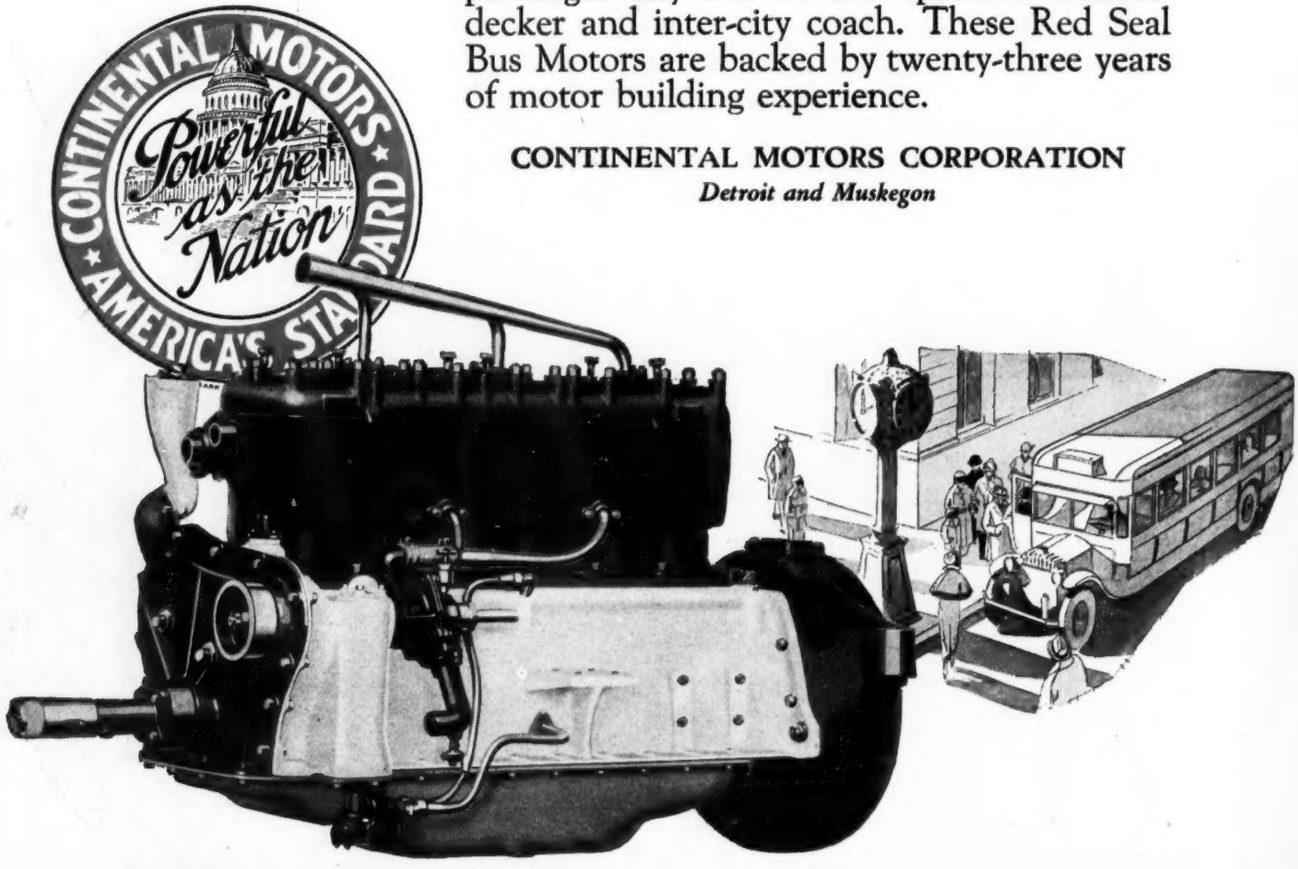


LARGEST MOTOR SPECIALISTS IN THE WORLD

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. 51 NEW YORK—THURSDAY, OCTOBER 9, 1924 No. 15

Frederick J. Haynes Tells—

How Dodge Brothers Has Kept Going Profitably at Top Speed

By Norman G. Shidle

"WE don't do anything startling out here, Mr. Shidle. We haven't any unusual methods or remarkable ideas. We just try to use good common sense." These were the words of a man who almost overnight has become one of the outstanding figures in the automobile business. They were in reply to my question, "Why has your company been able to keep going profitably at top speed while a larger part of the automotive industry has been in the doldrums?

Never a seeker after publicity, Frederick J. Haynes, president of Dodge Bros., attracted relatively little attention from the industry at large for some time after he took over the reins of the big organization which he now heads. Two years ago, mention of his name in any automotive group would have called forth little comment of any kind.

But Mr. Haynes has become prominent in spite of himself.

Today he is spoken of whenever automobile men get together and argue about policies. He has become a vivid figure to those who follow the fortunes of the industry.

What has caused the change of attitude toward this modest executive who still shrinks from publicity except when it is forced upon him? The answer is easy. Success. Solid, practical, hard-won success achieved during one of the most trying periods the industry has experienced and in the face of odds which would have daunted a less hardy character.

The answers which the Dodge Bros.' president made when questioned about his success are typical of the man; modest as regards self-glorification, yet positive and very definite about his convictions which have been formed on a basis of careful analysis and long practical experience.

HIS knowledge of the transportation industry dates back to bicycle days. He came into the business in 1895 as assistant to John F. Dodge when the latter was general manager of the National Cycle & Automobile Co. of Hamilton, Ont. He succeeded to the position of general manager when Mr. Dodge went to Detroit. Later Mr. Haynes became works manager of the Franklin Automobile Co. and in 1912 took the same post in the Dodge Bros.' organization. He has been president of the company since the death of the Dodge brothers in 1920.

Having disavowed any unusual abilities in charting the course and handling the helm of one of the biggest automotive enterprises in the country, Mr. Haynes went on to outline clear-

THE first question of a list presented to Dodge Brothers' factory salesmen some time ago was, "Who is Frederick J. Haynes?"

Only a small percentage of these men answered the question correctly.

Far from being perturbed about this lack of notoriety, Mr. Haynes was pleased by the incident, for he believes sincerely in team work rather than individual stars.

This is the fourth of a series of articles on Profits versus Volume. The fifth will appear in next week's Automotive Industries.

ly and specifically the common-sense philosophy which has proved so excellent a basis for his automotive management. It is true that there is nothing startling in the principles on which he operates. They are almost revolutionary in their simplicity.

Just as the homely philosophy of Abraham Lincoln solved national problems of the utmost complexity, so an unpretentious business creed consisting of a few clean-cut fundamentals has enabled Frederick J. Haynes to answer correctly most of the perplexing commercial problems with which his company has been faced in recent months.

"We hear a lot about 'putting things over' and 'getting away with it' in the automobile business," Mr. Haynes said reflectively. "That's all wrong. To be successful a company must have two things: goodwill and a sound product sold at a price which represents honest value. If you have the goods, you don't have to put anything over.

Good Times Build Good-Will

"I look on good times in business simply as an opportunity to build up more widespread good-will so that when bad times come along enough people will have confidence in your product to keep you going along on a profitable basis despite business conditions.

"A good many people don't realize how really valuable good-will is. Why, it's the biggest asset a company can have. Anybody can replace your buildings, your machinery and your organization. Nobody but yourself can take away your good-will. That goes for the relations of the manufacturer with his parts suppliers as well as with his dealers and the public.

"We never take a contract away from a parts maker who has been serving us well just because some other fellow comes along and offers us the same thing for a few cents less. It doesn't pay. It's not fair to go back on a company that has been giving you good service for a number of years and with which you have built up real good-will.

"It's not fair and we won't do it!" Mr. Haynes leaned forward in his chair to emphasize his feelings.

"There is one parts maker who has been trying very hard to get our business for several years. The company which is supplying us with that particular part has been giving us satisfactory service for a long time. Its product has been satisfactory; its prices have been fair; its service has been honest. But this other company wants the business very badly. They even went so far as to try to work on us through one of our big distributors.

Problems of Buying Parts

"When this distributor came into the factory the last time he talked to me about the possibility of giving our business to this new parts maker. He said it would please him very much if we should do so. Finally I found out that the parts maker was thinking of buying a fleet of trucks from this distributor. After I heard his story I said to him:

" 'Yes. I'll give our business to this new company. I'll give it to them tomorrow if you can give one single reason, which would be satisfactory to our present supplier, as to why we should take his business away.'

" 'Why,' the distributor replied, 'of course I can't do that.' "

" 'No, I told him, 'you can't. And he isn't going to get the business. Besides he's a poor business man if he has an idea of buying trucks from you for any other reason than that he thinks he can get better service at lower cost out of Dodge Bros. trucks than out of any others.' "

Prices Not of First Importance

Mr. Haynes was in earnest. There could be no doubt about that. He didn't raise his voice and he didn't pound the desk. Yet no one could have doubted that he was in earnest.

"Prices often are the least important phase of parts buying," Mr. Haynes went on. "We always look at the reputation of the supply company, its operating efficiency and its record for honest dealing. If a company is sound on these fundamentals its prices are almost certain to be right."

There is nothing very complicated in the production situation, as Mr. Haynes sees it. A factory is foolish to build more cars than its dealers can sell at profit to themselves, he says, and adds that it ought to be possible to predetermine that number with some degree of accuracy if proper study is given.

"There isn't any sense in hitching a 1,000,000-gal. pump to a 500,000-gal. pipe line," he said; "it isn't good business to try to force cars on dealers.

"The production schedule has to be built from the field—not from the factory. Manufacturing facilities must be arranged to suit sales demand; you can't make the demand suit the plant capacity. That's just common sense.

"We get from all of our dealers four financial statements every year and a certified statement once a year. These reports give us our basis for estimating how many cars a dealer can handle profitably and safely. We don't let them have any more.

Supervise Dealer Finance

"We exercise more supervision over our dealer finances than do most automobile companies, but the practice has resulted in very material benefits both to the dealers and to ourselves. We have worked out three uniform accounting systems which are now in use by more than 95 per cent of Dodge Bros. dealers. One of the three systems will fit any dealer, whatever the size of his business. Over 75 per cent of our retailers are using the flat rate system which has been worked out by the factory.

"This close touch with dealer affairs makes it possible for us to keep factory production pretty well in line with the needs of our retail organization. We are not at all interested in getting cars into the hands of dealers. We want them in the hands of the public. Until the dealer disposes of a car it is not sold as far as we are concerned. If there is any single reason why Dodge Bros. has kept on an even keel during recent months it is because we have built our factory operations on the basis of conditions in the field.

"We always have worked out very carefully all of the systems or plans which we have urged our dealers to adopt. We do not assume a dictatorial attitude toward dealers, as we want them to go forward on

their own initiative as much as possible. We do put on considerable pressure, however, to get them to adopt certain policies which we know are to their advantage as well as ours. We work out our policies carefully and then we don't have to change them every year.

"Our dealer education work has not been flashy, but it is constant and practical. We try to deal with fundamentals of real importance, which actually will help the dealer to make money. The financial statements I have mentioned. Our used car plan already is pretty well known in the trade. Just like our other policies, it isn't startling. It's just good common sense.

"We say to our dealers, your business is composed of five parts:

Car sales	Maintenance	Truck Sales
Parts sales	Used car sales	

"Each part must be profitable in itself. You can't be successful if you let new car sales bear some of the burdens of the used car department. You are in business to make money and every department must contribute to that end. That's where the uniform accounting system comes in. Working on this basis the used car policy simply amounts to this: 'Don't pay a price for a used car which will not permit you to recondition it at a profit.'

"You may ask whether we don't lose some sales because of this policy. Certainly we do—with pleasure. Any sales we lose because somebody wants us to present a prospective buyer with fifty or a hundred dollars are profitably lost. We make it possible for our dealers to carry out this same used car policy by refraining from giving them more cars than they can handle — and we know enough about their business to know how many that is.

Frederick J. Haynes

Loading the Dealer

"A company may get some advantage for a month or so by shipping to dealers cars which they can't sell. But it doesn't mean anything. The manufacturing economies achieved through high production during the months of such shipments are more than eaten up in the ill will and merchandising inefficiencies generated in the field.

"We get detailed weekly reports from all of our dealers, so that we know accurately all the time just how many cars they have in stock, how many are in transit, and the rate at which sales are going forward. These figures, correlated with the financial statements, form a sound basis for planning factory production and shipments. By use of these methods we have been able to make money for our dealers and for ourselves."

Matter of Absolute Fairness

Mr. Haynes paused. Then, suddenly — "There's no charity in any of this, you understand. We aren't philanthropists. We are just operating on a sound business basis. We don't have to dictate to dealers to get them to do as we suggest, because we have been careful to treat them with absolute fairness in the past and thus have got their confidence and respect. We aren't giving anybody anything for nothing. We are just playing fair—just trying to give an honest service and an honest value to everybody with whom we come in contact."

"What about the subdealer situation?" I asked.

"Well, that just gets down to a few simple principles, like all the rest of business problems," Mr. Haynes answered.

"How many subdealers are too many? It is obvious that there are too many when all of them can't make profits satisfactory to themselves. There's about so much business in a given territory. If it is enough to provide a good living for five dealers, ten will go broke trying to work it. If you have a piece of pie that will satisfy the appetites of five normal men, ten or fifteen will starve if they depend on it for nourishment.

"It doesn't do any good to have a lot of dealers just so that you can get rid of a few cars through the credit they may be able to drum up for the time being. Automobile manufacturers must get it out of their heads that they can sell cars to dealers. It can't be done. Cars have to be sold to the public.

"I've heard that some manufacturers are planning to warehouse a lot more cars at the factory than has been their custom in the past. Warehousing doesn't sell cars. Dealers and distributors should be perfectly capable of carrying whatever stocks actually are necessary at any period of the year, and

it isn't good to build more cars than they can handle properly.

"You know it's remarkable how many seemingly complex problems become relatively easy to solve when you reduce them to simple terms," Mr. Haynes went on musingly. "And almost everything can be reduced to a few basic principles. Whatever measure of success we have achieved has come from a very definite attempt to operate every phase of our business in accordance with sound fundamentals. We aren't much for publicity out here. We do our regular advertising, of course, but we don't go in for bizarre stunts. We're busy making an honest product and trying our best to get it widely distributed so that it will have the best possible chance to build more good will for itself and for the organization which makes it. We emphasize team play rather than individual stars."

This last statement is directly in line with the answers made to a questionnaire presented to Dodge Bros.' factory salesmen at a convention some time ago. The first question in the set of queries was:

"Who is Frederick J. Haynes?"

Only a small percentage of these men answered that question correctly.

Mr. Haynes himself, far from being perturbed about this lack of notoriety, was pleased by the incident.

I turned to leave Mr. Haynes' huge office with its vast expanse of rugs and its solid, conservative, confidence-provoking furniture and the president of this big modern organization turned back to his task of putting into practice the principles which he had just outlined. And there came very vividly to my mind the words of another nationally known automotive executive whose office I had left to keep my appointment with Mr. Haynes. "The man whom you are going to see," he had said, "is doing a big job in a big way and a good many of us might well emulate him."

Commerce Department Helps Business Make Profits

REORGANIZATION of the Department of Commerce, the formation of commodity bureaus and the close coordination of this government department with the practical needs of business, has benefited all industries very greatly in recent years. Developments of special value to automotive men have been particularly numerous, culminating recently in the organization of a traffic accident investigation which should have a far-reaching effect.

While the general scope of the service available has been common knowledge for some time past, the introduction of new features in recent months makes timely an investigation conducted by the Conference of Business Paper Editors to determine how the facilities of the department might be used to greater advantage. The summary compiled by a committee of this organization shows that the work of the Bureau of Foreign and Domestic Commerce has been reconstructed and greatly expanded on a new basis of expert specialized attention to specific groups of commodities instead of the purely geographical and technical basis that formerly obtained. New activities of all sorts have been undertaken.

Sixteen commodity divisions have been created through which close cooperation has been established between the Bureau and trade associations.

The Division of Simplified Practice, established in 1921, assists producers and consumers in mutual efforts to eliminate waste in production and distribution and has assisted in eliminating superfluous and unnecessary varieties in sizes and dimensions in many fields, thus reducing the accumulation of excessive stocks of little used sizes.

The usefulness and scope of the Bureau of Standards has been greatly extended. A complete revision of government specifications is under way. In cooperation with the industries of the country the Bureau is assisting in the great problem of eliminating waste. It has assisted in the preparation of specifications, codes, and ordinances, all having for their primary purpose the increasing of industrial efficiency.

In addition to his efforts to make of each bureau and division of the Department of Commerce a practical service agency for business, Secretary Hoover is much interested in the meaning that lies behind the cultivation of a sense of responsibility on the part of business and industry to work together and with the government along the lines he has so often advocated, in constant search for methods by which the business world can develop and enforce its own standards and thus stem the tide of governmental regulation.

Late in February of this year, the Chamber of Commerce of the United States, the American Railway Association, the National Automobile Chamber of Commerce, the National Safety Council, the National Bureau of Casualty and Surety Underwriters, the American Automobile Association, the American Mutual Alliance, and the American Engineering Council were requested to confer on the street and highway traffic problem of the country. The number of motor vehicles of all kinds had increased to 15,000,000. Congestion of streets and highways was growing; the annual number of traffic accidents was steadily mounting. These facts raised the question whether motor facilities had not reached the saturation point. There was the possibility of a national crisis, both from the standpoint of the conservation of life and limb and from the standpoint of the industry itself.

A brief survey of the situation developed the fact that in 1923 there were more than 19,000 fatal traffic accidents and that from 1917 to 1922 the automobile death rate had increased from 10.2 per cent of the total number of accidental deaths to 17.9 per cent. In addition the most conservative calculation places the total number of non-fatal personal injury accidents at 400,000 annually, to which must be added a vast number of accidents resulting in property damage only. The cost in dollars per year has been variously estimated at from a half to two and one-half billion. The automobile industry is producing annually at least three million more cars than are scrapped, and it is not difficult to picture the situation within the next five years unless there is devised and put permanently into effect a distinct national policy of street and highway practice, which will serve as an accident prevention program, and at the same time increase the usefulness of these same streets and highways by facilitating the movement of traffic.

Novel Brake Mechanism and Dozen New Models Are Paris Show Features

Thirteen American cars appear at French exhibit. Prospects are bright for good business in 1925. Great increase in fabric bodies. Overhead valve engines gain.

By W. F. Bradley

PARIS, FRANCE, Oct. 4 (*By Cable*).— A dozen new chassis models, several novel brake constructions, a tremendous increase in the number of fabric bodies and the appearance of an unusually large number of American cars are the chief features of the nineteenth annual Paris Passenger Car Show, which opened here Oct. 2 and which will close Oct. 12.

Thirteen American vehicles are on exhibition, a number larger than in any previous year. Every French, Italian and Belgian manufacturer of importance is represented, while three English exhibitors complete the salon. The American cars represented are Lincoln, Overland, Ford, Dodge, Packard, Oldsmobile, Oakland, Marmon, Chevrolet, Buick, Studebaker and Chrysler.

Most of the American makers seem more interested in getting sales connections throughout Europe than in attempting to sell cars in France itself. Nevertheless, the great number of American exhibits is causing some apprehension among the French manufacturers.

The business outlook for 1925 is very promising. Recent statistics show that the number of cars in France has increased by nearly 100,000 during the past year, and there is every indication that this rate of growth will continue for some time to come. Removal of the import duties in England has proved helpful to the French industry, but the additional volume of business resulting from the removal of the British levies has not been nearly so great as was generally expected.

There have been no price changes on French cars, although cuts have been made on exported vehicles. Practically all of the French makers, however, are giving much more liberal discounts to distributors and dealers.

Few Changes in Models

Mechanically the show reveals less change than any salon for the last three years. All the manufacturers seem to be much more interested in pushing on toward quantity production than in introducing new models. About a dozen entirely new chassis are on exhibition, but most of the changes are along the same lines as those made last year.

Hispano-Suiza has brought out a small six-cylinder model and has abandoned aluminum cylinders for iron cylinders with detachable head. Practically all other chassis features on the new car remain the same as on the big six, which is being continued.

Fiat has entered the light car field with a new 2-3 passenger car carrying a four-cylinder 55 cu. in. overhead valve, overhead camshaft engine. This new model is fitted with four-wheel brakes and balloon tires. It is the intention of the Fiat company to produce this light car in large numbers, but deliveries are not expected to begin until the middle of 1925.

Italia has an entirely new chassis carrying a six-cylinder overhead valve engine with piston displacement of 122 cu. in.

Peugeot and Voisin have added new sleeve valve models to their line. The powerplant of the new Peugeot has a piston displacement of 145 cu. in., while the displacement of the new Voisin is 125 cu. in.

Four-cylinder models continue to dominate, with the sixes in second position. No new eights are shown. The overhead valve engine has made some progress, but a great majority of the engines carry the camshaft in the base chamber. The use of aluminum pistons has become more general and a tendency to employ alpax metal pistons also is noticeable.

Rolls-Royce Has Four-Wheel Brakes

All Rolls-Royce models are equipped with mechanically operated front wheel brakes. No stripped chassis are shown, however, so that it is impossible to examine the brake mechanism in detail. It is reported that the front brake control bears a resemblance to the Hotchkiss system.

The greatest brake novelty of the show is the Dewandre servo operating on vacuum in the intake manifold. This construction is being used on Voisin, Nagant and Ballot, while other makers are considering its adoption.

No hydraulic brakes appear at the show, but there is evidence that a great deal of detail work has been done on mechanical brakes during the past year. Peugeot and Delahaye have substituted a braking system of their own for the Perrot type.

Renault now is fitting an oil radiator on its big six and has equipped all of its large models with an engine-driven centrifugal oil purifier.

The plate clutch has gained considerable ground. Renault, who always has been a strong supporter of the cone type, is one of several to adopt the plate clutch this year.

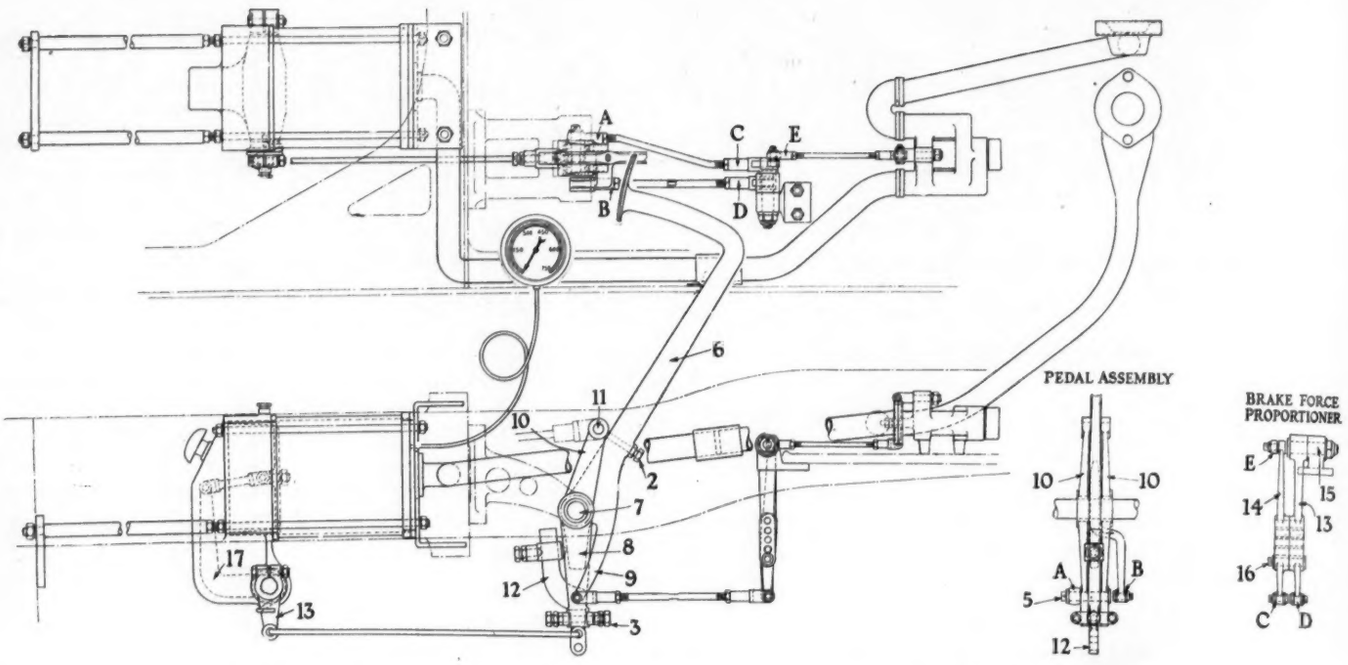
Balloon tires up to 5½ in. size are used on 90 per cent of the cars in the show, but few balloon tires of larger size are employed because the French makers are afraid they might cause trouble at high speed.

Citroen has introduced an all-steel sedan from America and is planning to build it in a new factory which will contain 500,000 sq. ft. of floor space.

The show reveals an immense increase in fabric-covered bodies on metal-covered plywood and on frames such as those used in the Weymann system. Many bodies somewhat similar to the Weymann type appear at this show.

No commercial vehicles appear at this exhibit, since a separate truck show is scheduled for Oct. 22-31.

In producing a smaller model, the Hispano-Suiza company has merely followed the general tendency in Europe.



General layout of the Dewandre servo operations on vacuum in the intake manifold. This brake, which is the novelty of the show, is used on Voisin, Nagant and Ballot

Soon after the Armistice the firm brought out a high grade six of 3.93 by 5.5 in. bore and stroke, and to this has now been added a smaller six-cylinder car of 3.3 by 4.3 in. cylinder dimensions, built on the same general lines as the bigger model and intended to supplement it.

Cast Iron Cylinders in Small Hispano-Suiza

Instead of aluminum cylinders with liners the new model has cast iron cylinders with a detachable cast iron head, but the external appearance is much the same. Apart from lower cost, the cast iron cylinders have the advantage of being more silent by eliminating resonance, and the detachable head is a concession to public demand for this type of construction. The valve gear is exactly the same as on the bigger car, consisting of an overhead camshaft with direct operation of the valves, the camshaft being driven by an inclosed vertical shaft at the front. The crankshaft has circular webs and is mounted in seven plain bearings.

Coil and battery ignition is used, with a double distributor and two sets of plugs, the construction in this respect being similar to that of the big six. The crankcase webs are brought right up to the frame members and there are two breathers on top of the webs leading into an air passage cast with the crankcase. The duplex Solex type carbureter is mounted directly above the outlet mouth of this air passage and the opening between crankcase and carbureter air intake is closed up by a collar. While this is not a complete air filter, it is said to permit very little foreign matter to reach the cylinders, and has the advantage of making the air intake perfectly silent. As on the big six, the aluminum dashboard forms a tight fit with the clutch housing, causing all the air drawn through the radiator to be expelled laterally through the louvers in the side of the hood. The engine is a high-speed type, peaking at 3800 r.p.m.

Chassis features are the same as on the bigger car. Unit construction of engine and gearbox is employed, with four forward speeds. Unlike the bigger model, a welded pressed steel rear axle housing is used. The spherical head of the torque tube is received in a casing on a cross frame member. Springs are semi-elliptics front and rear, and the four-wheel brake layout, with Hispano-Suiza friction type servo, is practically the same as on the big six. The two brake levers on the rear axle are brought up alongside the differential housing with a view to simplifying connections, but this position also has the advantage of offering less danger if a tread leaves the tire or if a tire comes off the rim. One recent fatal track racing accident in England was attributed to a tread winding round a rear wheel brake lever and locking the wheel.

Four main types of servo mechanisms are in regular production on the Continental market. Delage and Fiat, each on a high grade six, have a hydraulic servo combined with mechanical brakes, comprising two cylinders and a pump mounted in the base of the gearbox, each cylinder having a couple of opposed pistons. Although developed independently, the two systems are similar in their general lines of construction and are intended to supplement the physical effort of the driver while giving a direct mechanical application if the servo should become inoperative and at its point of least efficiency when car speed is low.

Hispano-Suiza is continuing the friction type of servo brake brought out three years ago, and is now using it on the medium as well as on the big six-cylinder car. Licenses for the use of this servo mechanism have been taken up by Renault (who is applying it to two big six-cylinder models), by Sunbeam, by Delahaye (one model), and by Mors.

No Brakes on Rear Wheels

The Hallot friction type servo brake, in which centrifugal weights are employed to obtain the necessary friction and also to prevent sliding of the road wheels, is a standard fitment on Chenard-Walcker and Bignan cars. Both these firms have removed their brakes from the rear wheels.

A new type of servo brake, making use of the vacuum in the intake manifold, has been brought out by Albert Dewandre, a Belgian engineer, and is used by Voisin on all models, by Ballot, and by the Nagant company in Belgium.

The appliance consists of a cylinder, which on the Voisin car has a diameter of 5½ in.; a pipe from the

cylinder to the intake manifold; a two-way valve or regulator, which may be mounted on the connecting pipe or on the cylinder block in case of a cast manifold; and additional levers on the brake pedal with connection to the vacuum cylinder and to the distributor. The total weight is 47 lb.

Brakes Voisin Uses

In the drawing of the Voisin brake, pedal 6 is mounted free on shaft 7 and has extensions 8 and 9. Mounted free on shaft 7 are two levers, 10, forming a fork united at their upper end by cross piece 11, to which the brake rod is connected by a yoke and at their lower end by pivot 5. Lever 12, called a reaction lever, is mounted on pivot 5.

The three levers, 6, 10 and 12, have their relative movements limited by stops 2, 3 and 4. Stop 2 limits the return movement of the brake pedal. Stop 3 limits the movement of pedal 6 before it operates on lever 10. Movement of brake lever 6 causes lever 12 to pivot around axis 5 until it comes in contact with stop 3. From this point on lever 10 has the same movement as brake pedal 6.

The end of lever 12 is connected by cable to lever 13, keyed on a shaft which rotates under the action of the piston in the servo cylinder. From the end of lever 9, forming a part of the brake pedal and of pivot 5, uniting the forks 10, two rods A and B are carried to the ends of levers C and D. One of these levers (13) pivots around axis 15, while lever 14 pivots around axis 16, forming an integral part with lever 13. Rod BD moves with the pedal, while rod AC moves with brake lever 10. On the end of lever 14 there is a pivot, E, from which connection is made to the distributor valve.

When standing, brake pedal 6 is kept in its off position by a spring between levers 10 and 6. Stop 2 is in contact with lever 10. There is atmospheric pressure in the servo cylinder, the valve from this cylinder to the intake manifold being closed. When the pedal is depressed, the first effect is to close the air valve and to bring the servo cylinder into communication with the intake manifold. By reason of the vacuum, the piston is drawn in toward the head of the cylinder, thus causing a pull on lever 12 and moving the brake control levers. The motion of pivot E is limited by stop 3, which is adusted to allow the required opening of the vacuum valve.

If the pedal is stopped in its downward movement the servo continues to act, bringing rod AC toward the rear, causing lever 14 to pivot around axis 16 and bringing connecting rod E to the rear until the vacuum valve is closed and the action of the servo is cut off. If the pedal is released it moves back until stop 2 is in contact with lever 10, in which position the servo cylinder is open to the air and the brakes are released. With the engine stopped, the brakes are applied direct by means of lever 12.

The object of stop 4 is to limit the movement of the reaction lever in a positive direction. In other words, if the reaction is not counterbalanced by the operator it may close the vacuum valve, but it cannot open the air valve.

It is possible to regulate the braking effort through the servo either by raising or lowering the point of application of the servo cable to lever 12 or by raising or lowering the knife-edge of the reaction lever. A standard adjustment on the Voisin gives the following pressure on the brake pedal and on lever 6, this being with the engine throttled down as low as possible:

Peal pressure	15	23	31	53	75	lbs.
Pressure on lever 6.....	55	77	110	130	154	lbs.

Advantages claimed for the Dewandre vacuum servo are that it does not adsorb any power, is equally effective for both directions of motion, is easy to apply and is quick and smooth in action, and that failure of the servo mechanism does not interfere with manual application of the brakes.

New Jersey Commission Drafts Bus Specifications

TENTATIVE specifications for buses have been formulated by the Board of Public Utility Commissioners of New Jersey and some open hearings concerning them have been held, while many manufacturers have been asked to submit constructive comments. A summary of the specifications follows:

Body length over all shall not exceed 21 ft. or be less than 16 ft. Maximum width 94 in. and minimum 84 in. maximum inside height, floor to ceiling, shall not be less than 76 or more than 78 in.

Six dome lights of at least 15 c.p. are required in 16-ft. bodies, 8 in 18 ft. and 10 in 20-ft. bodies. One step lamp is required in each body.

All coaches are required to carry the following equipment: a suitable heating system approved by the municipalities, a guard rail to prevent passengers from obstructing view of driver, a wood and glass partition behind driver's seat, at least four ventilators satisfactory to municipal authorities and commission, window guards at least 8 in. high, push buttons between windows and a stop light. No coach shall be operated with solid tires.

Gasoline tank must be located outside of body and front floor boards must be of steel or of wood protected by fireproofing material. Maximum height of chassis frame, top to ground, is fixed at 32 in., while its length should be equal to that of the body and should extend to the body sills. The bumper shall extend 4 in. beyond body and be fixed to chassis frame. A clear entrance of 24 in. is required at entrance and exit doors. Seating arrangements are left to the municipalities subject to approval of the commission.

Comments received by the commission include the following:

Since the New Jersey law specifies a width of 96 in. it is not clear why a limit of 94 in. is set. Bodies longer than 21 ft. are in satisfactory use today. Bodies of less than 16 ft. length for special purposes should not be ruled out, nor should bodies of less than 84 in. width be legislated against. Inside height restrictions proposed would eliminate many so-called de luxe type bodies. No guards are needed at windows which open from the top down and do not fall to a position lower than the height of an 8-in. guard.

Many coaches are operated safely with gasoline tanks inside the body. There are difficulties in placing tank outside the body, especially when it is low-hung. If it is placed too low, danger from fire due to leakage caused by damage is considerable.

A partition back of the driver has disadvantages as well as advantages. It adds weight and the glass may break and cause injury to a person thrown against it. Three ventilators are said to be adequate on some buses. The amount of ventilation is more important than the number of ventilators.

An arbitrary elimination of solid tires is unwise. A compilation of statistics pertaining to bus body construction has been compiled by the Standards Department of the Society of Automotive Engineers.

Lieut. H. H. Mills and the Verville-Sperry plane in which he won the Pulitzer race

Dayton Air Meet Shows Marked Progress in Civil and Commercial Flying

Nearly 130 owners fly private planes to Wilbur Wright Field to see Verville-Sperry Racer win Pulitzer Race. Light machines make good showing in special events.

By Leslie S. Gillette

THE winning of the famous speed classic, the Pulitzer Race, by the Verville-Sperry Monoplane, with a speed of 216.5 m.p.h., brought to a close the International Air Races, the largest and most spectacular aerial meet ever staged. The events were held Oct. 2, 3 and 4. While it had been expected that the speed record of 243.6 m.p.h., established in the 1923 Pulitzer Race, might not be broken, a drop in speed of 27.1 m.p.h. in the 1924 event was not anticipated. Last year's race was won by a specially designed Navy Curtiss machine, while the planes securing both first and second places in the 1924 race had been in the Army service for several years. The death of Capt. B. Skeel, flying a Curtiss R-6 racer, cast a shadow over the main event. Capt. Skeel was killed when the wings of his plane collapsed as it dived for the starting line. This was the first fatal accident occurring in a Pulitzer race.

The three-day aviation convention was replete with meetings and social gatherings, which included a discussion of Naval Aeronautics at a session of the Dayton Section of S.A.E. and a banquet given by the National Aeronautical Association to the race delegates and flyers. Mingling in the crowd of 50,000 spectators at the Wilbur-Wright Field, the birthplace of aviation, were the Air attachés of several foreign governments, besides many high Army, Navy and Government officials. The World Flyers arrived at the field escorted by twelve army planes.

Included in the program were several thrilling feats, which embraced the dropping of a Sperry airplane from the Army dirigible TC-5, pursuit ships taking off and flying in formation tied together with 60 ft. of cord, dropping of fireworks by night flying formations, refueling in the air, flight of original plane built by the Wright Bros., sky-writing, the bombardment of a miniature New York City by a squadron of Martin Bombers, aerial combats and eccentric flying. Some of these stunts have never before been attempted.

But the real feature of the meeting was the visual proof given of a rapidly growing corps of civilian flyers and of practical progress in commercial aviation development.

OF the approximately 300 aircraft attending the meeting, 125 machines were owned and operated by civilians, several of the latter coming from points over 1000 miles distant. This was the greatest number of airplanes ever assembled in one place. While many new types of strictly commercial airplanes were present, with the exception of the various "light" planes described later, no particular novel design trends were to be found. All commercial machines were of the orthodox single-engine type.

An interesting new machine is the Wacco biplane. Powered with a six-cylinder Liberty engine, giving 220 hp., it has regular accommodations for six passengers,

besides room for another beside the pilot above the inclosed cabin in the fuselage. The machine is said to have a 12-1 factor of safety.

The Yellow Air Cab Co. entered in several races a four-passenger cabin monoplane, known as the "Aircab," built especially for them by the Bellanca Airplane Co. The "Aircab" is a thick-wing monoplane having a 90-hp. air-cooled radial motor giving the machine an air speed of 80 m.p.h. Col. Hartney, general manager of the Yellow Air Cab Co., stated that his organization plans to build 200 "Aircabs" in Detroit. Plans are being made to operate nine cabs out of Chicago and three out of each of the following cities: Cleveland, Detroit, Washington. The rate is to be 20 cents per passenger, per mile, only the distance out being paid for. Passengers may make return trip free if desired.

CARRYING eight passengers, their baggage and considerable additional equipment, the Stout all-metal Liberty engine monoplane flew to Dayton from Detroit. No structural changes have been made in this machine since it was described in AUTOMOTIVE INDUSTRIES recently. The fitting of a new type of muffler proved so effective that an electric siren has been installed so as to give a warning and clear the way while landing. Three more machines identical with the present plane are being built in Detroit in order that jigs and tools may be standardized before commencing upon their regular production schedule. It is interesting to note that the Stout machine ("Maiden Detroit") was the only American all-metal machine at the meet. It is claimed that the machine now weighs 600 pounds less than the night flying DH-4's in the Air Mail service. Other interesting commercial machines were the Fairchild-Fokker, Junkers Monoplanes, Laird-Swallow and Hartzel.

No machines of entirely new design were to be seen among the military airplanes, although various modifications had been made in current models. With the exception of the Curtiss PW8A, which finished third and last, with a speed of 167.2 m.p.h., the machines in the Pulitzer Race were three years, or more, old.

The plane on which the Army was placing its chief reliance was destroyed several weeks ago when Lieut. Alex. Pearson was dashed to pieces during the test flight. No foreign machines were able to compete in this race, as all the fast European planes have a landing speed in excess of 100 m.p.h, 25 m.p.h. more than necessary to qualify for the Pulitzer event.

Except for the substitution of a rebored Curtiss D-12 engine developing 520 hp., in place of the regular 500-hp. motor used last year, and improved streamlining of the fairing added to the under-carriage in its retracted position under the fuselage, the winning Verville-Sperry monoplane remains unchanged. The Curtiss R6, which finished second, also is fitted with a special 520 hp. engine. It is similar in many respects to the winning machine in last year's race, although the 1923 Navy Curtiss used a different wing curve, less gap, and shorter wing chord. Metal propellers were not used by the 1924 entrants except on the special PW8A plane.

The PW8A is a specially modified Curtiss PW8 pursuit plane. The chief differences from the standard type include shorter wings, one bay instead of two and the substitution of rectangular radiator below the engine and ahead of the leading edge in place of the wing type radiators.

According to regulations, everyone flying in military airplanes wore parachutes. Many civilian pilots also were equipped with "chutes." Because of the narrow cockpits, special 24-ft. parachutes were constructed for the Curtiss pilots in the Pulitzer Race, but on account of the closeness to the ground when his plane collapsed, Capt. Skeel was unable to save himself with this safety device.

SEVERAL new satisfactory experiments were to be seen among the Army machines. These included an inverted Liberty 12 engine mounted in a DH4B plane. This engine actually develops 12 more hp. than when operated in normal position. A supercharged Liberty 12 having a two-speed reduction gear, wherein it is possible to change speeds or "throw-out" the propeller while in operation, also was seen. There was also another DH4 having an all-metal variable pitch propeller. In the shops, a device was being

What Happened at the International Air Races

National Cash Register Trophy

(Open to all two-seater low horsepower civilan airplanes)

Place	Pilot	Plane	Engine	HP	Speed MPH
1st	W. Lees	Hartzell	Curtiss	125	97.5
2nd	P. Hutton	Laird	Curtiss	125	93.2

COURSE—6 laps. Total, 90 miles.

Central Labor Union Trophy

(Free-for-all race for civilian machines)

1st	C. S. Jones	Curtiss	Curtiss	125	125.0
2nd	J. C. Ray	Curtiss	Curtiss	143	107.2

COURSE—8 laps. Total, 120 miles.

Liberty Engine Builders Trophy

(Race for observation type civilian and military Airplanes)

1st	Lt. D. G. Drake	DH4 Spec.	Liberty	400	130.3
2nd	Lt. A. Simonin	DH4 Spec.	Liberty	400	128.0

COURSE—12 laps. Total, 180 miles.

Aviation Town and Country Club of Detroit Trophy

(Speed and efficiency race for Commercial Airplanes)

1st	B. L. Rowe	S-V-A	Curtiss	143	111.5
2nd	J. G. Ray	Curtiss	Curtiss	143	107.5

COURSE—8 laps. Total, 120 miles.

Dayton Chamber of Commerce Trophy

(Race for large capacity civil and military Airplanes)

1st	Lt. D. M. Myers	Martin	Liberty	800	109.8
2nd	Lt. C. F. Woolsey	Martin	Liberty	800	107.9

COURSE—10 laps. Total, 150 miles.

Dayton Daily News Trophy

(Race for civilian "Light" Airplanes)

Place	Pilot	Plane	Engine	HP	Speed MPH
1st	J. M. Johnson	Driggs Johnson	Henderson	19	64.0
2nd	E.Dormoy	Dormoy	Henderson	19	50.1

COURSE—5 laps. Total, 25 miles.

Detroit News Air Mail Trophy

(Race for Air Mail Airplanes and Air Mail Pilots)

(Canceled on account of lack of sufficient funds, and no available pilots for meet.)

Engineers Club of Dayton Trophy

(Speed and efficiency race for "Light" Civilian Airplanes)

1st	H. C. Mummert	Mummert	Harley-David.	18	38.2
2nd	J. M. Johnson	Driggs Johnson	Henderson	19	22.8

COURSE—10 laps. Total—50 miles.

John L. Mitchell Trophy

(Race for Military Pursuit Type Planes only)

1st	Lt. C. Bettis	Curtiss PW-8	Curtiss	460	175.4
2nd	Lt. D. F. Stace	Curtiss PW-8	Curtiss	460	173,7

COURSE—4 laps. Total, 124 miles.

Pulitzer Trophy

(International race for High Speed Airplanes)

1st	Lt. H. H. Mills	Verville Sperry	Curtiss	520	216.5
2nd	Lt.W.H. Brookley	Curtiss R-6	Curtiss	520	214.4

COURSE—4 laps. Total, 124 miles.

Curtiss R-6 racer in which Capt. Skeel was killed. A similar machine won second place

constructed in which four Liberty motors are to drive a single 15 ft. propeller. The four engines are geared to an internal ring gear which is connected with the propeller. It is possible to stop and adjust any two of the engines without interfering with the running of the other two. An air-cooled Liberty 12 was also seen under construction.

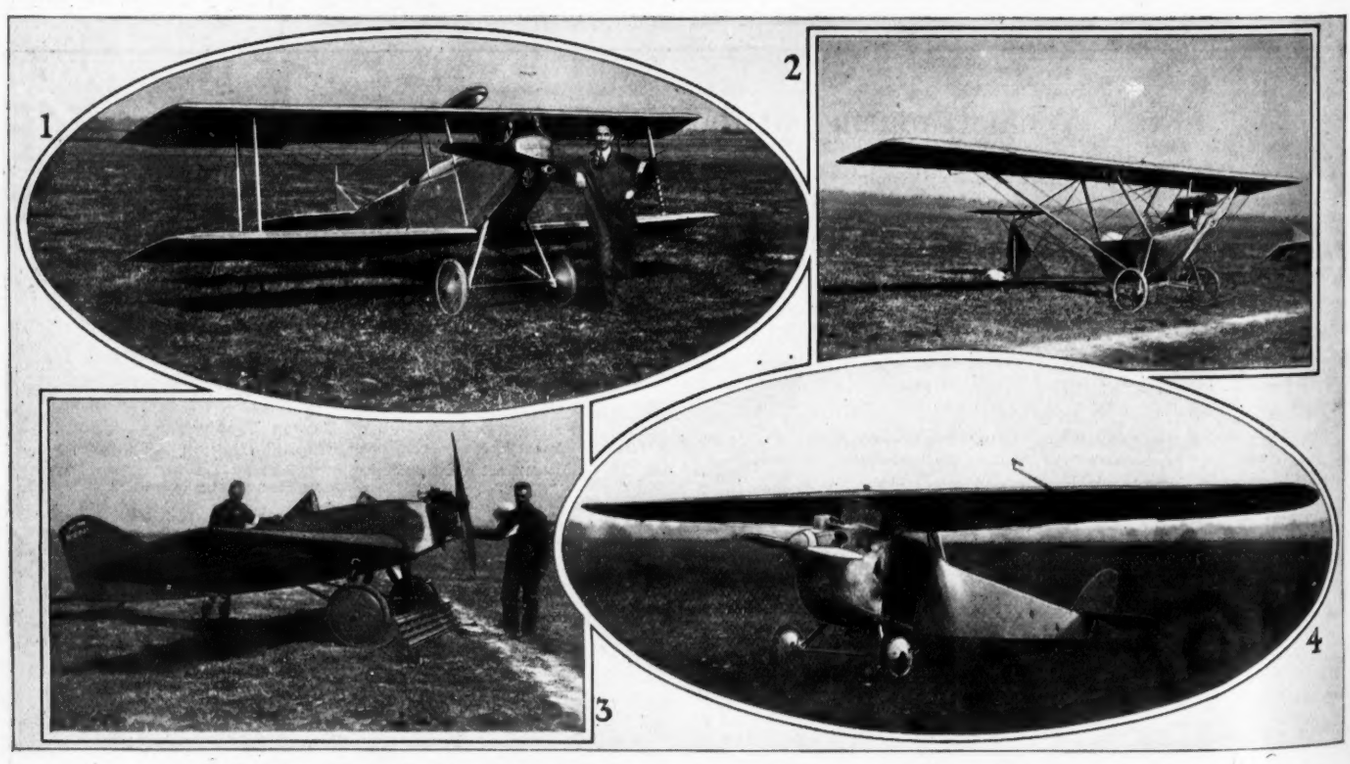
As the accompanying photographs show, great diversity of design appeared in the "light" planes. All machines of this type flew exceedingly well and were under perfect control in spite of the comparative high winds which prevailed throughout the races. No specially designed aero engines were employed and in every case the propellers were driven either by a two or four cylinder standard motor cycle engine, the hp. ranging from 17 to 21. Of the six "light" machines participating in the event designed for such planes, the three securing first and second places in all events were monoplanes, others being biplanes. Most of the machines had very clean lines and followed the general designs of service planes.

The pilot in the Driggs Johnson plane, one of the winning machines, sat in a totally inclosed cock-pit in the triangular shaped fuselage below the cantilever main wing. The machine was fitted with a four-cylinder Henderson motor cycle engine and had an air speed of approximately 65 m.p.h. Another interesting machine was the Dormoy known as the "Flying Bathtub." This also was a monoplane and used a four-cylinder motor. The pilot, however, sat in a small egg shaped nacelle to which was attached the under-carriage and one of the outriggers of the tail unit. In spite of its somewhat strange appearance, the ship performed exceedingly well. Another winning machine was the Mummert monoplane, powered with a two-cylinder Harley-Davidson motorcycle engine. The biplanes followed standard practice, the engines being mounted in the nose and the fuselages carefully streamlined.

THE Mulvehill model trophy race for model airplanes proved to be very interesting. One of the tiny crafts propelled by rubber bands flew a mile and a half and remained in the air ten and a quarter minutes, securing the first prize and breaking all records for model flying.

The development of naval aeronautics and the problems encountered in operating aircraft over the water either from ships or shore stations were reviewed by Commander H. C. Richardson, U. S. Navy, in a paper read before the S.A.E. (Aviation Section) at the Engineers' Club, Dayton, on October 2, Commander Richardson dealt with the various types of machines at present used by the Navy, the construction of metal floats which save considerable weight and eliminate water soakage, the advantages of a single type of float over the dual type, the development of catapults for launching planes from ships under way, the progress in designing accessories for navigation and ordinance, and the operation of lighter-than-air machines.

After the reading of the paper, Mr. H. M. Crane, President of the S.A.E. and Chairman of the meeting, called on Mr. C. G. Grey, editor of the "Aeroplane" (England) to speak on the developments of aircraft in Europe. Com-



1—Macready's "Baby Bomber." 2—Dormoy's "Flying Bathtub." 3—Mummert's monoplane, winner of one event. 4—Driggs-Johnson, a winner which finished in both events in its class

mander Richardson in his paper spoke of the F5L flying boats used extensively both in England and in America during the war as being the outcome of British design, but Mr. Grey pointed out that the original plans of the machines similar to the F5L were originated at Hammondsport by Mr. Glen Curtiss. Mr. Grey spoke of a flying boat that is being used successfully in England as having 2400 hp. At the request of Mr. Barling, designer of the Bomber bearing his name, Mr. Grey spoke of the development of the slotted type of wings used in Europe, pointing out that while this construction is successful in reducing the landing speed as well as in giving the machines a steeper angle of climb, trouble is being experienced in their operating mechanisms.

The vast number of civilian airplanes which were flown to Dayton was one of the impressive features of the Meet, said Mr. Grey. On account of government restrictions and the high cost of operation, he stated, very few private airplanes are in use in England.

Mr. G. H. Madelung, Engineer of the Junkers Corp. of America, spoke of the advantages of metal construction in airplanes and stated that with this construction a machine should have a life of 300,000 hours which compares favorably on a commercial basis with the 700,000 hours average life of a locomotive. His company has built planes which have stood out in the open without any protection whatever for four years and which are capable of the same performance as the day they were built, Mr. Madelung claimed. He also spoke on the heat treating of duralumin used in metal planes in order to eliminate corrosion.

Mr. Crane asked Commander Richardson about the comparative costs of wooden and metal floats, which brought the reply that as so few floats of the one type are ordered at the same time, the cost of a metal float is approximately $7,000 as compared to the wooden one at $900. In reply to a question put by AUTOMOTIVE INDUSTRIES, Commander Richardson stated that satisfactory progress was being made in launching sea planes from ocean going submarines.

Tentative Baking Enamel Specification Formulated

H. C. MOUGEY, chairman of the Paint and Varnish Subdivision of the Passenger Car Body Division, S. A. E. Standards Committee, has drafted the following tentative specification for black baking enamel. Criticism of this specification is desired.

General.—This specification covers a high-grade black baking gloss enamel to be applied by a baking process to metal parts, such as fenders.

Durability.—The requirements as to durability are that the enamel shall give the maximum durability in actual service, consistent with other properties, such as baking time, baking temperature, luster and flowing properties. When not enough time is available to make service tests, the following tests are recommended.

Consistency.—The enamel must be furnished in such a consistency that when reduced with gasoline in the ratio of one part of gasoline to four parts of enamel, poured on a panel of 100-lb. tin, and allowed to drain in a vertical position for 15 min., it will give a film that when properly baked will have a thickness of between 0.0008 and 0.0010 in. measured 3 in. from the top. In case the enamel is furnished in such consistency that it requires a greater or less amount of thinner than that specified above, the required amount of thinner may be used provided the non-volatile matter in the enamel as thinned for the test is not less than 33 per cent by weight.

If it is necessary to use a different amount of thinner than 25 per cent by volume of the unreduced enamel, the percentage of thinner required should be stated, as all comparisons of cost shall be made on the enamel reduced to working consistency.

Before an enamel is approved for production, a test should be made on keeping qualities, and all enamels that "liver" or thicken greatly on storing for several months in the containers should be reported as unsatisfactory.

Baking Time and Temperature.—The baking time of the enamel, when applied as described in paragraph 3, shall be not less than 1½ hr. at 400 deg. Fahr. and not more than 3 hr. at 400 deg. Fahr. Tests should be made in a gas-heated oven in which the temperature is accurately and uniformly controlled, the temperature being 400 deg. Fahr. when the test panels are placed in the oven. Indirect heating shall be used to prevent gas fumes from being discharged into the oven where the tests are made.

Tests on Baked Panels.—To determine the correct time, four panels of the enamel, when applied as described in paragraph 3, will be baked at 400 deg. Fahr. One panel will be removed from the oven at the end of 90 min., one at the end of 120 min., one at the end of 150 min., and one at the end of 180 min. These panels will be allowed to stand over night and then tested as described below. At least one panel shall satisfactorily meet all requirements.

(*a*) The finish produced shall be a dense black, smooth and with a deep luster.

(*b*) The film shall be so hard that it may be scratched with the finger nail only with great difficulty or not at all.

(*c*) The enamel shall not wrinkle. A small amount of wrinkling on heavy "fatty edges" is permissible.

(*d*) The toughness of the film shall be such that the panel may be bent 180 deg. on a diameter of ⅛ in., without the enamel cracking at the bend.

(*e*) The film produced by the enamel shall stand immersion for 24 hr. in kerosene at room temperature without softening or blistering. This test shall be made by testing with the finger nail, in comparison with another section cut from the test panel and held as a standard without immersion in kerosene.

Chemical Composition.—The enamel submitted shall meet the following chemical requirements:

(*a*) The enamel shall be free from pigment.

(*b*) The ash shall not be over 0.50 per cent.

(*c*) The non-volatile matter shall not be less than 40.0 per cent. The non-volatile matter shall be determined by drying a sample of from 1.5 to 3.0 grams in a pint friction-top lid in an oven for 5 hr. at 115 to 120 deg. C. (239 to 248 deg. Fahr.).

Practical Tests.—The enamel shall work satisfactorily as determined by a practical test in the enameling department of the factory, before it is finally approved. Drying time is specified for purposes of test at 400 deg. Fahr. In actual production the temperature of baking may be above or below 400 deg. Fahr. as desired.

The above tests are recommended for black baking enamels composed of the materials usually used in making black baking enamel. Special compositions may give a product to which the above empirical tests do not apply. Such special compositions should be tested by exposure test on panels exposed at an angle of 45 deg. facing the south, in comparison with other samples of known performance; in addition, tests in actual service should be made before the enamel is approved.

Modern Bus Needs Forced Ventilation and Increased Heat Supply

Former can be furnished by connecting suitable ducts in roof structure to exhaust fan in flywheel, while latter is obtainable from engine water jacket.

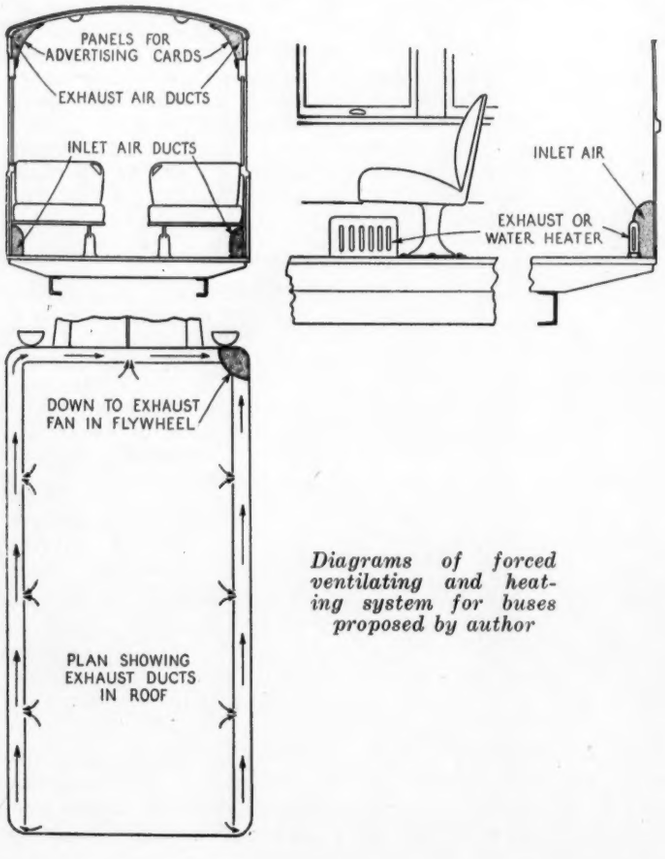
By Lewis Yorke

PRESENT inadequate methods of heating and ventilating buses should give way to more efficient methods in keeping with the mechanical excellence of the powerplant and the chassis.

No particularly serious problem of ventilation is encountered during the temperate months so long as the weather is fair. But as soon as a downpour of rain necessitates the closing of all windows, humidity increases, air becomes stagnant and reeks with the odor of wet clothing and considerable discomfort prevails. In cold weather the danger element of befogged windows is added to the discomforts of stagnant air.

When a considerable number of people is assembled in a limited space such as that provided in bus bodies, some other means of air circulation than that resulting from the motion of the bus is essential to complete comfort. The ordinary form of roof ventilator is inadequate and the type which creates an induced draft when the bus is in motion is not much better.

Such ventilators function satisfactorily on railroad cars where speeds average above 40 m.p.h., but bus speeds, as a rule, are too slow to make such a device effective and when the vehicle stops frequently in heavy traffic, ventilators of this type are little better than simple roof vents. Apparently some more positive means of air circulation must be found.


PANELS FOR ADVERTISING CARDS
EXHAUST AIR DUCTS
INLET AIR DUCTS
INLET AIR
EXHAUST OR WATER HEATER
DOWN TO EXHAUST FAN IN FLYWHEEL
PLAN SHOWING EXHAUST DUCTS IN ROOF

Diagrams of forced ventilating and heating system for buses proposed by author

Electrically Driven Fans

Electrically driven exhaust fans immediately suggest themselves, but there arises the question of a source of power, particularly since bus lighting outfits are always loaded to capacity when adequate illumination is provided. Also, the electric exhaust fan would be an added unit demanding periodic maintenance attention. Why not, then, use the engine itself as the means of driving some form of exhaust or induction fan, preferably incorporating the fan in the engine flywheel?

For many years air cooled engines have employed just such exhaust or suction fans for circulating the cooling air past the engine cylinders. The efficiency of these fans has been increased from year to year and they now represent highly developed units. It would seem entirely practical either to substitute some form of Sirocco blower for the flywheel, or to drive a fan by belt or chain from the crankshaft. The former scheme has the advantage of not disturbing the general layout of the powerplant and could be added with little or no increase in weight.

On the other hand, mounting the fan as a separate unit makes it possible to install the ventilating system as optional equipment. In either case the ventilating system would be in operation whether the bus was moving or not, since bus drivers seldom stop the engine when their vehicles are in service.

A fan load should not add an appreciable drag on the engine because bus engine speeds are generally low. It is reported that the fan on the Franklin car requires but little more than one horsepower to drive it at a speed of 1600 r.p.m. Yet this fan can handle 900 cu. ft. of air per minute at a car speed of 20 m.p.h. Assuming that a single deck bus body contains about 700 cu. ft. of air, this rate of discharge would effect a complete change of air more than once each minute, quite an improvement over present conditions.

Installation of a mechanically induced ventilating system would entail but little complication. The body should have air exhaust ducts incorporated in the ceiling. These could run along the sides of the roof in an unobtrusive way with openings at intervals to insure the collection of foul air throughout the entire length of the bus. These air ducts could run down the forward end of the bus and terminate under the floor in a suitable casting so that tubing could connect the outlet with the inlet of the exhaust fan.

Fresh air would find its way into the bus in many

ways. Since the exhaust fan would create a natural depression inside the body, air would leak in around the windows and door opening as it does in a railroad Pullman. Better still, air inlet ducts could be provided along the base or floor of the body similar to those in the roof. These ducts could be made to communicate with the outside air at a point where exhaust and engine odors would not contaminate the incoming air.

An advantage of this latter arrangement lies in the possibility of conducting the fresh air directly past the bus heaters in the cold season. Certainly, if some such scheme of positive ventilation is made practical, motor buses will have another advantage over crowded street cars and subway trains.

Exhaust Fumes

While on the subject of ventilation, one wonders why it is that the air in most motor bus bodies must be contaminated with obnoxious exhaust gases. The writer frequently has found long distance rides in buses an unpleasant experience solely on account of the nauseous condition produced by a combination of rough roads and continued breathing of exhaust-laden air.

Sealing the floors of the body to prevent the entrance of engine odors from beneath the bonnet does not eliminate the trouble. It does little good to take this precaution when the muffler tail pipe is located directly under one of the windows of the bus.

Endeavors to so place the exhaust outlet that this nuisance is eliminated showed the fallacy of having the tail-pipe at the rear of the bus, since the gases were drawn into the rear door or rear windows by the back draft always present in the wake of a moving vehicle. Has anyone experimented with a smoke-stack scheme advocated by some? A pipe projecting above the bus roof at some suitable point may be worth a trial.

Bus ventilating and heating problems are closely related. Something to supplement the inadequate exhaust heaters now used is needed. Such heaters are useful and practical, of course, and should be retained, but they seldom have sufficient capacity to heat adequately large buses in very cold weather.

Examining the heat losses in a conventional automotive engine we find that about 40 per cent of the heat of the fuel escapes with the exhaust. At least a part of this is being utilized at present. In addition some 30 per cent of fuel heat is lost through the cooling water. This is the heat dissipated by the radiator and the cylinder jackets.

In the case of a bus engine developing 20 hp. at service speeds, this heat supply will amount to about 600 B.t.u. per min., enough to raise the temperature of 700 cu. ft. of air per min., about 50 deg. Fahr. Air passing through the average automobile radiator is raised from 25 to 50 deg. Fahr. above its initial temperature. If practicable means can be found for utilizing it, this heat should be carried to the interior of the bus body.

Several schemes suggest themselves. First, the source of inlet air for the ventilating fan suggested previously might be a shroud directly behind the radiator. In this case the air circulating fan also would function as the cooling system fan and would force fresh air into the body instead of exhausting the foul air. Or, the air inlet ducts along the bus floor could communicate with such a shroud, some suitable form of radiator fan being used to circulate the air. A portion of the air would probably have to pass by the shroud to ventilate the space under the bonnet.

There would, of course, be danger of drawing in exhaust-laden air when the bus stopped in traffic behind other vehicles with idling engines. Then there is road dust to be contended with. A more complicated arrangement would be to conduct the cooling water to radiators suitably located in the bus body.

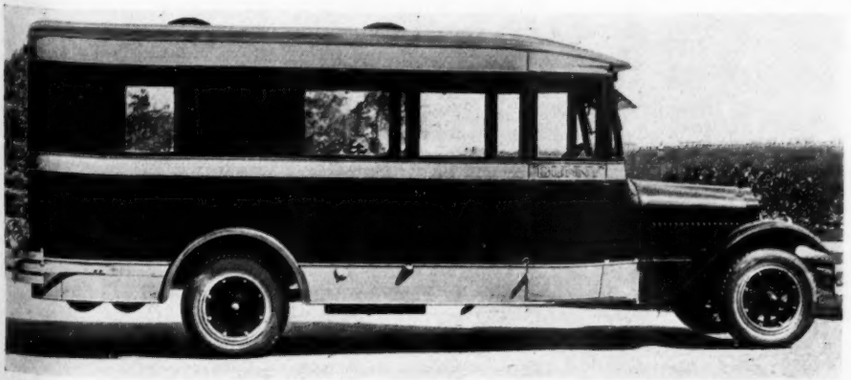
There is also the possibility of steam-heated buses if vapor engine-cooling systems come into use. Returning the cooled and condensed water, avoiding steam and air pockets, and guarding against leaks are some of the obstacles to be overcome in installations where the water or steam are utilized.

All the foregoing are simply suggestions, but they are by no means lacking in practicability and are well worth trial by those who are seeking to improve bus service conditions.

Motor Coach Built with Fabric Body

WHAT is said to be the first fabric-leather coach body to be constructed has been produced recently by the E. J. Thompson Co. of Pittsburgh. This body is of the type advocated by the manufacturers of Meritas fabric-leather which is used for covering it and the body is built under the Childs patents. The interior is trimmed in brown brocaded fabric-leather.

This body, a photograph of which is reproduced in the accompanying cut, is equipped with pullman type berths, wicker chairs, shower bath, toilet and a kitchen fitted with stove, sink and refrigerator. Two thirty-gallon water tanks are suspended from rear of chassis and water is supplied under pressure from an engine driven pump. Ventilation is provided through Nichols-Lintern ventilators, electric fans and windows which are designed to drop flush with the belt. The windows are equipped with specially designed roller screens and curtains. A number of other features are incorporated in this body to provide comfort in touring.



Fabric covered touring coach built by the E. J. Thompson Co.

The Latvian Government has decided to introduce the metric system as of Jan. 1, 1924.

Low Weight and Great Shock Absorption Chief Aims of Bumper Design

Greatest capacity for absorbing energy within defined limits of weight and deflection is goal sought. Modern methods give severe test under shock and static load.

Part I

By P. M. Heldt

WHEN casually considered, the design of a bumper seems to be a very simple problem consequently it is interesting to note the many variations in form and the very considerable refinement of detail that has been embodied in these devices. In order to produce a bumper of the highest merit the designer must be guided by certain basic principles.

The parts of the car most subject to accidental injury probably are the fenders. The exposed parts at the front of the car include the lamps and the radiator, and in case of a serious collision even the engine and the frame may be injured. It is the object of the bumper to prevent—or at least to reduce—damage to these parts.

It is, of course, impossible to design a practical device which would protect a car against injury when running headlong into a stone wall at high speed, or into any other solid object of great mass, but the great majority of collisions, fortunately, occur after the car speed has been reduced to a low value by the brakes. In such a case damage to the car often may be entirely prevented by a properly designed bumper.

The automobile bumper today seems to be a development of a device referred to as a fender, which was intended to serve substantially the same function as the fender on street cars, that is, to prevent or minimize injury to pedestrians who might be hit by the car. In many cities trolley cars are compelled by ordinance to carry fenders, and inventors of such devices tried time and again to induce city councils to pass similar ordinances with respect to automobiles. In fact, the cities of Detroit and Chicago in 1913 adopted ordinances compelling the use of fenders on motor trucks. While present day bumpers may be of some slight value in reducing the risks of personal injury, their chief object is to protect the exposed portions of the car, and they must be designed with this in view.

Bumpers and Collisions

In the operation of motor cars, front end collisions are much more frequent, and generally more serious, than rear end collisions, and while both front and rear bumpers are being sold, the former are in much more extensive use than the latter. It has been suggested to also carry bumpers at the sides, but so far, at least, this proposal has not met with any hearty response from motorists. In addition to the regular front and rear bumpers, several manufacturers turn out rear fender guards, which afford protection at the rear of the car to the fenders only, the connecting bar being carried forward at the middle so as not to interfere with the removal and replacement of the spare tire or spare wheel.

One of the chief inducements to the automobile owner to fit a bumper is that it entitles him to a reduction in the collision insurance premium rate, provided the bumper is of a make and type that is approved by the Underwriters' Laboratories for the class of car on which it is to be fitted. Practically all of the bumpers on the market bear the endorsement of the Underwriters' Laboratories for use on either limited weight classes or on all cars.

When a car is suddenly brought to a standstill from a definite speed by a collision, an amount of energy must be absorbed which depends upon the mass or weight of the car and upon its speed at the moment of impact. This energy in foot-pounds is given by the well-known formula for kinetic energy—

$$E = W\ V^2\ /2g$$

where W is the weight of the moving mass in pounds; V, the speed in feet per second and g the acceleration of gravity ($= 32.16$). This energy can be absorbed by elastic and plastic deformation of parts on which the forces of impact act, and by friction between parts which are caused to slide over each other by the impact.

Elasticity Absorbs Light Impact

If the impact is slight the whole of its energy will be absorbed elastically by the bumper, the members of which will resume their original shape after the impact is over. On the other hand, if the energy of impact is greater than the bumper is capable of absorbing elastically, then the bumper will be permanently deformed or take a permanent set. Finally, in some bumpers, in which the parts are held together by friction or partly by friction and partly by rivets, etc., after the force of impact on the bumper has reached a certain value, these joints will yield and the resulting friction absorbs additional energy.

All grades of steel have a certain elasticity and are capable of absorbing a certain amount of energy elastically. However, the amount of energy which can be stored in soft, low carbon steel is quite small as compared with that which can be stored in high carbon spring steel. The earlier passenger car bumpers, which had channel bars pressed of soft steel, and practically all of the present day truck bumpers, which are made of rolled section steel, unhardened, are designed to absorb the energy of collisions chiefly by plastic deformation. This brings up the question of the best material for bumpers, to which we will return later.

All steel has practically the same modulus of elasticity, viz., about 30,000,000. This means that if we subject a cube of steel with sides one inch in length to a pull or tension of one pound in a direction perpendicular to one of its faces, the cube will be lengthened in the direction

of the pull by 1/30,000,000 in. The greatest pull which we can apply to the cube without deforming it permanently is equal to what is known as its elastic limit. This is about 30,000 lb. p. sq. in. for low carbon steel and about 70,000 lb. for high carbon steel of the kind usually used in bumpers.

Thus when the cube is subjected to a tension of 30,000 lb. it will stretch

$$30{,}000 / 30{,}000{,}000 = 1/1{,}000 \text{ in.}$$

The work done in thus stretching the cube is equal to the increase in length times the average resistance opposed by the cube to the stretching force. This resistance increases uniformly from nothing to the full 30,000 lb. Hence the work done is

$$\frac{1/1{,}000 \times 30{,}000}{2} = 15 \text{ in.-lb.}$$

In the case of the high carbon steel the amount of energy which can be stored elastically is equal to

$$\frac{(70{,}000/30{,}000{,}000) \times 70{,}000}{2} = 82 \text{ in.-lb (approximately).}$$

Much greater quantities of energy could be stored elastically in the highest grades of alloy spring steel, such as silico-manganese steel, the elastic limit of which when properly tempered is in the neighborhood of 200,000 lbs. p. sq. in but this steel is not used for bumpers, probably because when thus tempered it will absorb but little energy by plastic deformation.

From the above it will be seen that if an inch cube of steel is subjected to a tension equal to its elastic limit it will stretch by an amount S/E where S is the elastic limit and E the modulus of elasticity. The resistance to this stretching operation varies from nothing at the beginning to S at the end and has a mean value of $S/2$. Hence the work done in stretching the steel to its elastic limit is

$$(S/E) \times (S/2) = S^2/2E.$$

The above figures represent the amount of energy which can be stored in the steel elastically, without any permanent set, if the steel is subjected to uniform tension throughout its mass. In a bumper the members subjected to deformation are usu... in the form of beams subjected to bending stresses. In a beam the stress on the material is not uniform, but decreases from the outermost fibers of the section to the neutral axis, the fibers along which are not subjected to any stress at all. The beam fails when the stress in the outermost fibers attains the breaking point, and the average stress therefore is only one-half the stress on the outermost fibers.

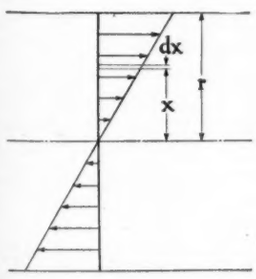


Fig. 1—Showing fiber stress in section of beam subjected to a bending moment

There does not seem to be any possibility of employing steel in tension for bumper purposes, and we must be satisfied with its lower capacity for storing energy when subjected to bending strains. When subject to bending, a unit mass of steel will take up only one-third as much energy as when subject to tension, as may be seen from the following:

In Fig. 1, let the vertical line represent a cross-section through a rectangular bar of steel subjected to bending stresses. As indicated by the arrows, the fibers to one side of the neutral axis are subjected to tension and those on the opposite side to compression. We will represent the unit stress in the outermost fibers by S; then the stress in the fibers located at a distance x from the neutral fiber is $S\ (x/r)$, where r is one-half the thickness of the bar. Now let us take a thin layer dx of the bar in which the stress may be considered uniform. The energy stored in the steel of this layer per unit of volume is evidently

$$\frac{S^2\ (v/r)^2}{2\ E}$$

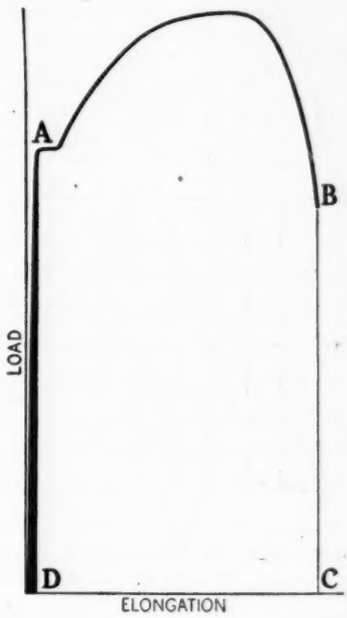


Fig. 2—Stress strain diagram of chrome steel, showing the relative quantities of energy which can be absorbed by a unit mass of this steel in elastic and in plastic deformation

This layer has a volume $w\ l\ dx$, and the total amount of energy stored in it therefore is

$$\frac{S^2\ (x/r)^2\ w\ l\ dx}{2E},$$

where w is the width of the bar and l its length. The energy stored in the whole bar then is represented by

$$\int_{x=-r}^{x=r} \frac{S^2\ (x/r)^2\ w\ l\ dx}{2\ E} = \frac{S^2\ w\ l}{2\ E\ r^2} \int_{x=-r}^{x=r} x^2\,dx =$$

$$\frac{2\ S^2\ w\ l}{2\ E\ r^2} \times \frac{r^3}{3} = \frac{S^2\ w\ l\ r}{3\ E}$$

As the volume of the bar is $2\ w\ l\ r$ the energy stored per cu. in. is

$$\frac{\frac{S^2\ w\ l\ r}{3\ E}}{2\ w\ l\ r} = S^2/6\ E$$

Comparing this with the expression for the energy stored per cubic inch in uniformly stressed steel, viz., $S^2/2E$, we see that it is only one-third of the latter value. This helps to explain why rubber bands have been found to give a more effective shock absorber for the landing gear of airplanes than any steel spring construction that could be devised. Owing to its greater elastic deformability, rubber can be worked in tension while acting as a shock absorber, which is not practicable with steel.

If we set down the elastic limit of bumper steel at 70,000 lb. per sq. in., the amount of energy which can be stored elastically in the bumper members is

$$(70{,}000 \times 70{,}000) / (6 \times 30{,}000{,}000) = 27.2 \text{ in.-lb. per cu. in.}$$

and, considering that the weight of steel is about 0.27 lb. per cu. in., the amount of energy which can be stored per pound of the steel is

$$27.2/0.27 = 100 \text{ in.-lb. (approximately).}$$

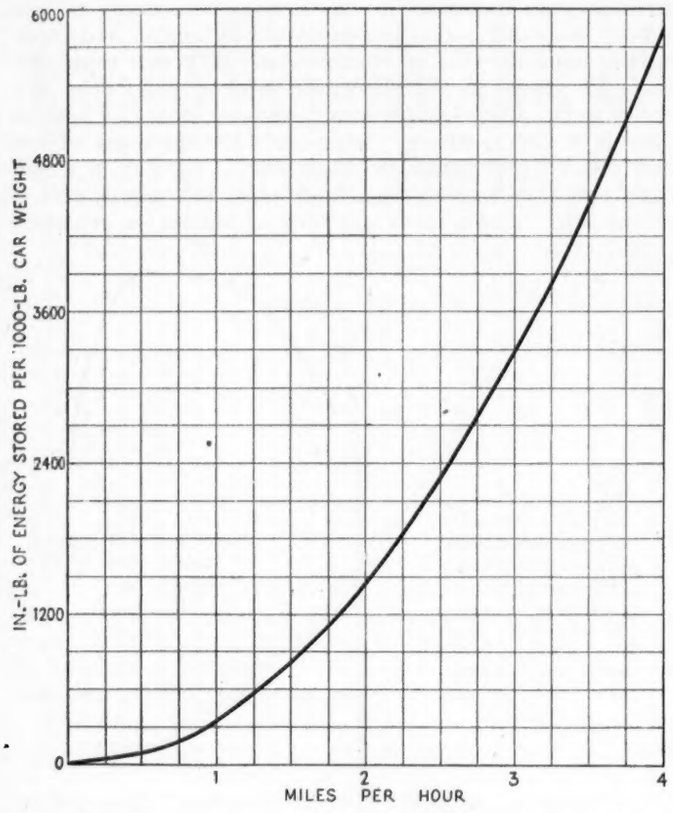


Fig. 3—Diagram of energy in inch-pounds stored per 1000 lb. of car at different speeds

Elastic deformation, however, is only one of the means of absorbing the energy of a collision. When the steel in the bumper has reached its elastic limit and the car has not yet been brought to a stop, plastic deformation will begin and the bumper will take a permanent set.

Fig. 2 shows a stress-strain diagram of a chrome steel quenched at a cherry red. The point *A* represents the elastic limit, and the area near the vertical axis shown in black represents the energy absorbed by elastic deformation, whereas the very much greater area *A-B-C-D* represents the work absorbed by plastic deformation in stressing the steel to the breaking point.

It was shown in the foregoing that medium carbon steel will absorb about 100 in.-lb. in elastic deformation. A 20 point carbon chrome nickel steel, one of the toughest steels used in automobile construction, when drawn at 1400 deg. Fahr. has an elongation of 35 per cent. This steel has an elastic limit of 50,000 lb. per sq. in. and a tensile strength of 75,000 lb. When stretching an inch cube of this steel beyond the elastic limit, the resistance starts at 50,000 lb., increases to 75,000 lb. and decreases again as the area at the section of the break is decreased. The average resistance may be taken at 85,000 lb., hence the energy absorbed would be

$$0.35 \text{ in.} \times 85{,}000 \text{ lb.} = 30{,}000 \text{ in.-lb.}$$

per cu. in. The energy which the steel would absorb if subjected to bending stresses up to the breaking point would be one-third of this, or 10,000 in.-lb. per cu. in., which corresponds to about 37,000 in.-lb. per lb. This compares with 100 in.-lb. per lb. which high carbon steel is capable of absorbing elastically. However, it should be pointed out in this connection that it is impossible with the present design of bumpers to take advantage of the full capacity of highly ductile steel for absorbing energy by plastic deformation, for the reason that the degree of deformation permitted by the available clearance does not stress the steel nearly to the breaking point, and if the design were made such as to result in considerable tension or pull on the bar, the force transmitted to the frame would increase so rapidly as to be sure to damage this member seriously.

Steels containing a higher percentage of carbon have less elongation and therefore are not capable of absorbing so much energy. Similarly the hardening of medium and high carbon steel reduces the amount of energy which the steel is capable of absorbing. This makes it plain why true spring steel is not an ideal material for bumpers. While a bumper of such steel would be very good for absorbing the shocks of light collisions which come within its capacity for absorbing energy elastically, it would be less efficient in the case of heavier shocks in which greater quantities of energy have to be taken care of, and for this reason plain and alloy steels of medium carbon content, tempered to a moderate degree of hardness, seem to be the most suitable materials.

One fact that is often lost sight of in discussing bumpers is that they are intended always to act in conjunction with the brakes. Unless the driver happens to be incompetent or very negligent, he will always perceive the danger before a collision actually occurs and immediately apply his brakes with full force. At the time the danger becomes apparent and the brakes are applied the speed may be quite high, but by the time the collision occurs and the bumper goes into action it usually has been reduced to a very moderate value. The bumper, of course, will relieve the shock and limit the destruction even if the speed at the moment of impact is high, but the greatest benefit is derived if the kinetic energy of the car has been previously reduced by the brakes to an amount that can be completely taken care of by the bumper.

Owing to the fact that the deflection of the bumper in tests is always measured in inches, the energy absorbed is best expressed in inch-pounds. From the diagram, Fig. 3, may be found the energy in inch-pounds which must be absorbed per 1000 lb. of moving weight in order to bring the weight to a stop from different speeds at the moment of impact. The expression for this value is

$$E = 364\,V^2 \text{ in.-lb.},$$

where V is the speed in miles per hour.

It is desirable, of course, to make the bumper as light as possible, not only because the cost of production increases with the weight but also because the bumper is used only in emergencies and ordinarily constitutes so much dead weight which tends to make the car sluggish and adds to the fuel consumption and to the wear and tear on tires. The principle may therefore be set down that for the same performance or the same degree of protection given, that bumper is the most meritorious which weighs the least.

Weight and Absorbtive Qualities

On the other hand, if we have two bumpers of the same weight, it is obvious that the one which is capable of absorbing the most energy is the most desirable and may therefore be set down as the most efficient. A doubtful point arises here from the fact that different bumpers fail in different ways. Some bumpers fail by breakage of a member before the deflection exceeds a certain limit, which usually is set by the construction of the car; that is to say, after a bumper has deflected about 12 in. it usually comes in contact with a part of the car, which will be injured if this deformation of the bumper is not sufficient to absorb all of the kinetic energy. This limit, however, depends more upon the design of the car than upon that of the bumper, and inasmuch as the bumper continues to absorb energy even after this point, if it is not broken, the proper point to carry the test seems to be

that of breakage rather than any definite limit of deflection.

Another point that may be raised in this connection is that the bumper may have to sustain an impact at any point along its length and not merely at the center, and if the test is confined to applying a load at the center a bumper may be given a high rating which is of little value when hit near one end. It has been suggested that tests of the energy absorbing capacity should be made with loads at a number of points along the length and the results integrated, and this proposal seems to have a very sound foundation; the only thing against such a test is that it is quite tedious and expensive.

The third method of absorbing energy of collision is by friction. In some constructions the main bumper bar is clamped in brackets which fasten to the spring horns or the frame members, and after the deflection of the main bar has attained a certain value the bar will slip in its fastenings, whereby energy will be absorbed. The amount of energy thus absorbed depends upon the pressure between the clamping surfaces and is hardly subject to calculation.

When a bumper receives an impact, part of the force of the impact will be transmitted to the frame and there will be a tendency to deform the latter. The proportion of the total force of impact that is transmitted to the frame depends somewhat upon the design of the bumper and upon its fastenings, and it is, of course, desirable that this be as small as possible. Moreover, the direction in which the force is applied to the frame members is of great importance, as the forward portion of the frame can withstand a great force in the fore and aft direction but is damaged by a much smaller force in a transverse direction.

In order to reduce the weight of the bumper and increase its energy absorbing capacity the designer must endeavor to so dispose his metal that all of it is stressed substantially equally when an impact occurs, the same as is done in the design of elliptic springs. Moreover, the weight of brackets and other parts which do not absorb much energy during an impact must be reduced to a minimum.

The bumper can mask only a small portion of the front of the car and it is therefore possible for exposed parts of the car to be struck even though it be fitted with a bumper. The wider the bumper the more effective the protection it affords, and for this reason double bar bumpers have come into extensive use, together with some triple bar designs. In other cases only the central portion of the bumper is made double or merely widened in order to increase the effective shock receiving area.

Method of Attaching

The front bumper is always secured in some manner to the forward ends of the frame side bars and if the bumper collides with an obstacle the force of impact will be in large part transmitted to the frame. It is not to be inferred from this that the force on the frame members is the same as it would have been if there had been no bumper, as this is obviously absurd, but that the force of impact between the bumper and the obstacle is almost integrally transmitted to the frame. The bumper accomplishes its work in limiting the force of impact in the first place. The slight difference there may be between the force of impact and the force transmitted by the bumper to the frame in the direction of the impact is due to the inertia of the bumper members.

Since the force of impact is transmitted to the frame, it is evidently possible for the frame and parts connected to it to be injured before the bumper is deflected so much that it abuts against the frame. For instance, if the bumper bars were made very stiff, so a very large impact force were required to produce even a moderate deflection, then, obviously, the frame would be damaged before the bumper had stored energy to its full capacity.

The frame is an elastic member, the same as the bumper, and will deform as soon as the bumper receives a shock and transmits the force of impact to it. At first the deformation will be elastic and after the impact has ceased the frame will return to its original shape. Evidently the aim in bumper design should be to so limit the force which can be transmitted to the frame members that the elastic limit of the latter will not be exceeded until the bumper has absorbed all the energy of which it is capable.

Bumpers, of course, are not designed for individual vehicles, but for a whole class, and it is therefore necessary to assume an average value for the maximum permissible impact force for the class. In a general way the force which the bumper will sustain increases with the deflection, the same as with leaf springs, but the deflection diagram is not a straight line, for one reason because in some designs of bumper a portion of the spring material becomes inactive after a certain deflection has been reached, and also because after a certain deflection the elastic limit of the bumper material is reached.

Largest Passenger Car Sizes

It appears that bumpers designed for the largest sizes of passenger cars are capable of absorbing from 20,000 to 24,000 in.-lb. of energy or, roughly, from 1700 to 2000 ft.-lb. If we assume that such a bumper is fitted to a car weighing 4500 lb., the maximum speed of impact for which the bumper will still absorb the whole of the energy may be calculated from the formula for the energy of impact per 1000 lb. of car weight which was given in the foregoing, viz.:

$$E = 364\ V^2 \text{ in.-lb.}$$

We evidently have in this case

$$24{,}000/4.5 = 364\ V^2$$

$$V = \sqrt{24{,}000/(4.5 \times 364)} = 3.83 \text{ m.p.h.}$$

This approximate proportion between the weight of the car and the energy absorbing capacity of the bumper seems to have been reached by the industry as a result of experience. It is quite possible to provide a bumper that will absorb all of the energy at higher speeds of impact, but the weight of the bumper quickly becomes excessive. The energy absorbing capacity increases substantially directly as the weight of the bumper, while the energy stored in the car increases with the square of the speed. A bumper of the size considered in the above example which will absorb all of the energy of impact at 3.83 m.p.h. weighs about 40 lb.; if it were desired to have a bumper which would absorb all of the energy at twice this speed, or roughly 7¾ m.p.h., it would have to weigh 160 lb., which is excessive.

While a majority of the bumpers carried on passenger cars have impact members of high carbon steel rolled in the form of flat bars, some have such members of either round or square tubular section of channel section pressed steel and of laminated wood. It was shown in the foregoing that in the ordinary spring bar under transverse load only one-third as much energy can be stored elastically as if the same bar were subjected to tension, and the same thing applies substantially with respect to the amount of energy which can be absorbed by plastic deformation. By using a hollow section this difference is to a certain extent eliminated, as there is very little metal near the neutral axis. The chief claim made for bumper bars of laminated wood is that they are lighter than steel.

This article will be continued in next week's AUTOMOTIVE INDUSTRIES.

Lack of Human Intelligence Is Cause of Most Traffic Accidents

Any remedy which presupposes this quality is doomed to failure, C. F. Kettering tells National Safety Congress. Cars cause danger, but also help to prolong life.

By Sam Shelton

SOME day the story will be written of what the automobile has done for the safety movement in America. It is only being talked about now indirectly, vaguely as persons talk when ideas are not well formed in their minds, and causes and effects are not fully understood. Where talk is about safety it is also about the automobile. Time and again it reverted to the motor vehicle in the public and private discussions of the Thirteenth Annual Congress of the National Safety Council at Louisville, Ky., Sept. 29 to Oct. 3.

Not that the automobile was openly given credit for what it has done in the promotion of public safety. Minds are not yet thinking on so straight a line. But—the span of human life is increasing. Dangerous diseases are being conquered. The automobile is a necessity to the physician. Prompt medical and surgical care saves many a life. Good roads and motor buses are making possible good schools in the rural districts and are banishing ignorance. People are living more in the country and driving to their work in the cities. Better health and greater happiness result.

These are some of the thoughts given expression in an unconnected manner by those who talk about the automobile and at the same time talk about safety. It is usually their intention to talk about the dangerous side of the motor vehicle, but it is interesting that almost unconsciously they catalog the achievements that some day will be bright spots on the record of the progress of safety.

And yet, it is lamentably true that the motor vehicle so often has been misused as an instrument of injury to persons and property that the members of the safety councils whose business it is to promote safety in the factory, on the streets, in the home, school, office and elsewhere find it advisable as they did at Louisville this week to make it a major subject of their discussions. They are confronted with the fact that in a more or less spectacular manner the motor vehicle in every city in the country and on rural highways kills and maims human beings.

Scope of the Councils

The safety councils which are members of the great National Safety Council are devoting their efforts toward the prevention of motor vehicle accidents just as they are toward the prevention of accidents in the foundry, in the machine shop, on the bathing beach or wherever else people engage in labor or recreation that carries with it a hazard.

It is fortunate that in the promotion of safety in the use of motor vehicles the safety councils have with them the whole-hearted support of the automotive industry and of the great body of organized motorists. This made it possible for the Safety Congress to draw upon the industry and the motorists' organizations for capable speakers to discuss the practical problems of making streets and highways safe.

The motor vehicle manufacturer views the Safety Congress from two points, first as the maker of a commodity which when improperly used is potentially capable of inflicting death or injury, and, second, as the proprietor of a shop which employs men and women upon tasks whose hazards can be reduced by precaution and safeguards.

It is significant that in this meeting there was no talk about inherent weaknesses in the motor vehicles themselves that might cause fatal accidents. There was talk about the human element, about the car driver and the pedestrian, about causes of accidents and how they may be avoided.

Intelligence the Only Remedy

Charles F. Kettering, vice-president of General Motors Research Corporation, who was one of the speakers, believes any remedy for accidents which presupposes intelligence is doomed to failure. He believes the general intellectual level is very low and that thinking is something which the majority of people refuse to do. He believes any safety measure to be at all successful must appeal very forcibly to the instinct for self-preservation. He would remove all "Danger" and similar signs from factories and shops. He says they are allowed to grow yellow with age, and nobody pays any attention to them unless it is to be moved by the suggestion of danger into the very fact itself.

He did not say anything about it, and probably he had not seen it, but there was exhibited in one of the halls a metal sign manufactured by one of the companies making a business of such things which read, "Dodge Danger Daily." What a pleasing and happy reminder to place before the worker, or the pedestrian, or the motorist every morning! One can well understand how the nerves of a factory worker who was forced to view such an atrocious suggestion every day might become weakened to the point of leading him directly into the path of danger.

A vehicle that is inherently safe has become the immediate cause of enough fatal accidents on streets and highways to call down upon it a great share of the attention of this great safety congress. The president, L. A. De Blois, in his opening address reviewed the progress of safety since the organization of the Safety Council thirteen years ago. The number of accidental deaths per 100,000 declined from 85 in 1913 to 68 in 1921. He said there was a slight increase in 1922 and 1923 which was "due to increasing automobile fatalities."

Thus the automobile took its share of blame for things as they are now, but got none of the credit. The accidental death rate is still far below what it was in 1913 and Mr. De Blois in his address says: "We are told by actuaries that the span of life is increasing." Perhaps

the automobile has helped to increase the life span. Fresh air may have something to do with it. Or milk that is transported quickly and safely by truck from the farm to city user. Or the doctor's car that quickly carries skill and medicine to the emergency. Or the motor ambulance that speeds the urgent case to the hospital. Deaths there are, of course, attributable to the abuse of the automobile, but if we only knew all the facts would not there be many lives saved to glorify the credit side.

Make Use of Automobiles Safe

A sincere and earnest purpose to make the use of automobiles in city and country as safe as is humanly possible was exhibited by various speakers. Mental tests for drivers, licensing of drivers and revocation of licenses, impounding of cars, uniform traffic codes, uniform speed laws —these were some of the topics touched upon by speakers.

Ernest N. Smith, general manager of the American Automobile Association, especially urged the enactment of uniform traffic codes and speed laws. He cited instances of accidents occurring to drivers in strange cities because they followed practices which were required in their home cities. He was thinking especially of the thousands of motor tourists who wander far from home every season. A proposal of prime importance that he urged for general adoption was the putting of responsibility for safety into the hands of safety engineers. By safety engineers he means scientific men with the qualifications and authority to study and devise workable traffic systems.

Mental tests for drivers before issuance of license are not practicable at this time, according to Dr. Arnold L. Jacoby of Detroit, who as director of the psychopathic clinic of his home city has examined many drivers who have figured in accidents. He finds that a suitable psychiatric test for the elimination of those mentally unfit to operate automobiles would consume about an hour in its application to each individual. He frankly declares that is too long, and the only hope he sees for such tests is that a group test might be devised that could be applied to a fairly large group in about forty minutes.

Dr. Jacoby finds it easy enough to measure the quantitative mentality of the driver so as to determine whether or not he has the mental capacity to be a good driver, but he finds it more difficult to measure the qualitative capacity. Qualitative capacity depends upon mental attitude, and he has found in most reckless drivers an egotistic attitude that causes them to think only of themselves, disregarding the rights of others.

The automotive section of the council, which includes those members who primarily are working to bring about fewer accidents in the automotive factories, held three interesting sessions. The central thought of all these was that safety reduces production cost and thus more than pays its way. Several safety engineers told how the installation of safeguards on punch presses and other machines not only reduced the number of accidents, but greatly increased the hourly output of these machines. In one factory a press which was fashioning 400 connecting rods an hour was causing a number of accidents to the hands of operators who fed it. The safety engineer spent $1,200 devising an automatic feeding device for this press and was severely criticized by his employer. But when the new safety device was put in use the output of the machine rose to 1600 connecting rods per hour.

The meetings of the automotive section were presided over by L. E. Averill, safety engineer of the Oakland Motor Car Co.

Quality of Gasoline Shows Slight Improvement

ACCORDING to the latest semi-annual survey of the Bureau of Mines covering the quality of gasoline marketed throughout the United States, compiled from data collected during July of this year, on the whole a slightly better grade of gasoline is being marketed than was marketed a year ago. There is an appreciable decrease in the initial boiling point in New York, Chicago, New Orleans, Bartlesville and Denver. Comparison of the averages of nine districts showed also some decrease in the 20 per cent end points but some increase in the 90 per cent point, in comparison with July, 1923.

As compared with the survey of January, 1924, the seasonal variation from winter to summer grades is not so marked, although there is a slight increase in the averages for initial boiling point. The average for "first drop" for the New York samples has increased, but the rest of the distillation range has remained practically unchanged. A slight increase is indicated in the Washington averages, with the exception of the 90 point, which decreased somewhat. The averages for Bartlesville, Pittsburgh and San Francisco registered an increase throughout the entire distillation range except at the 90 per cent point for San Francisco. The averages for Pittsburgh, Chicago, New Orleans, Bartlesville and Denver show a noticeable increase in the 90 per cent point, and this increase in some cases is high enough to fail Federal specifications for the 90 per cent point.

A distillation curve plotted representing the grand average of the analyses for the July, 1924, survey, together with a curve representing the distillation given on Federal specifications for motor gasoline, falls well within the limits of the Federal specifications; moreover it conforms in general shape very closely to the specification curve. The averages for the initial boiling point, 20 per cent point and 50 per cent point are considerably lower than the requirements for Federal specifications.

The essential features of Federal specifications for U. S. Government motor gasoline are as follows: First drop, 131 deg. Fahr.; 20 per cent point, 221 deg. Fahr.; 50 per cent point, 284 deg. Fahr.; 90 per cent point, 392 deg. Fahr.; end point, 437 deg. Fahr.; and at least 95 per cent shall be recovered as distillate from the distillation.

Average figures for each city are shown in the following table:

Average Results of Bureau of Mines Gasoline Survey, July, 1924

District	Specific Gravity	A. P.I. Degrees	First Drop	20 Per Cent	50 Per Cent	90 Per Cent	End Point	Ave. E. P.	Per Cent Recovered
New York City	0.742	59.2	105	203	275	385	427	273	95.9
Washington	0.761	54.4	115	193	249	366	412	258	96.1
Pittsburgh	0.743	58.9	104	185	254	386	429	262	95.5
Chicago	0.759	54.9	100	200	278	404*	439*	280	95.8
New Orleans	0.744	58.7	110	203	281	394*	432	278	96.2
St. Louis	0.749	57.4	103	199	270	395*	435	274	95.9
Bartlesville	0.744	58.7	101	195	274	398*	440*	276	95.8
Denver	0.757	55.4	110	204	285*	402*	438*	283	96.0
Laramie	0.750	57.2	104	205	279	399*	434	279	96.1
San Francisco	0.760	54.7	114	208	263	373	420	268	96.2
Average	0.751	56.9	107	200	271	390	431	273	96.0

*Failed to meet specifications for Federal purchases adopted February 3, 1922, and revised March 18, 1924.
Temperatures in degrees Fahrenheit.

A complete copy of Serial 2636 with detailed tables can be obtained on application to the Director, Bureau of Mines, Washington, D. C.

Duralumin, How It Is Treated, Handled and Protected Against Corrosion

Instructions for working cover—forming, bending, tube bending, spinning, forging, riveting, welding and soldering. Condensed data given on composition, mechanical properties and heat treatment.

By Horace C. Knerr
Metallurgist, Naval Aircraft Factory

THE rapid increase in the use of duralumin in the construction of aircraft of all types and in automobiles has created a need for condensed information on the characteristics of the material and the best methods of treatment and fabrication.

The term "duralumin" as used in the present paper refers to an alloy of aluminum, copper and magnesium within the following range of composition:

Copper	3.5 to 4.5 per cent
Magnesium	0.2 to 0.75 per cent
Manganese	0.4 to 1.0 per cent
Aluminum (min.)	92 per cent

This includes the alloy manufactured under the trade symbol "17S."

Duralumin bears much the same relation to aluminum as alloy steel bears to soft iron or steel and, like alloy steel, it must be suitably heat treated to develop its best physical properties. Heat treatment consists in raising to a certain elevated temperature and rapidly cooling, as by quenching in water. Contrary to steel, duralumin is soft after quenching, but it attains its maximum hardness and strength after "aging" for several days at room temperature. This characteristic is very useful in fabrication, as will be shown later. Like steel, duralumin can also be annealed, so that it will remain in a soft condition indefinitely, until given a hardening heat treatment, and it can, like steel, have its hardness and strength increased by mechanical working, such as cold rolling, but the ductility is correspondingly reduced.

FORMS Available.—Duralumin is produced in the form of sheet, strip, rod, bar, wire, seamless tube and extruded sections. It may be purchased in any one of four conditions, namely:

1. As rolled, forged, or extruded.
2. Annealed.
3. Heat treated.
4. Cold rolled after heat treating.

Physical Properties.—The tensile strength of duralumin in the heat treated state is about the same as that of mild carbon steel, namely, 55,000 to 60,000 p.s.i. (pounds per square inch), with an elongation of 17 to 22 per cent in 2 in., and its weight is about 5 per cent greater than that of aluminum, its specific gravity being about 2.82.

Heat Treatment.—To produce the specified physical properties—tensile strength 55,000 p.s.i. (minimum), elongation 18 per cent in 2 in. (minimum)—heat treats as follows: Heat to a uniform temperature of 490 to 510 deg. Cent. (915-950 deg. Fahr.), hold for twenty minutes or longer until thoroughly saturated, and quench in water.

Immediately after quenching the duralumin will be soft. It will then "age" at room temperature, increasing in hardness and tensile strength, at first rapidly and then slowly, for about four to ten days, when the maximum strength and hardness will be reached. These properties will thereafter remain constant at ordinary temperatures. Duralumin parts must be heat treated all over, in a single operation, and not in sections, as the latter causes areas of weakness. (Annealing may be done in sections, if desired.) Duralumin is very soft at the heat treating temperature, and must be properly supported and carefully handled while heating and quenching to avoid distortion. If the material is overheated, that is, above 530 deg. Cent. (985 deg. Fahr.), its physical properties will be permanently impaired.

QUENCHING.—Ordinarily, either hot or cold water is used as a quenching medium. (Oil may be used in certain cases.) The final physical properties obtained after quenching in water at room temperature or at the boiling point are about the same. Quenching in cold water leaves the material in a softer condition for immediate working, but is apt to cause more distortion than hot water. Parts which have been shaped before final heat treatment should, therefore, preferably be quenched in hot water. If distortion occurs, it may be corrected immediately after quenching, while still soft. When quenching in hot water, care should be taken on account of the spattering which occurs.

Annealing.—If it is desired to keep the material soft and workable over an indefinite period of time, and to obtain the maximum softness for bending or other cold working operations, duralumin may be annealed, as follows: Heat to between 350 and 380 deg. Cent. (660-715 deg. Fahr.), hold for 20 minutes or longer, until thoroughly saturated, and cool in water, in air, or in furnace.

Cold working, such as hammering, drawing or forming, will of course tend to harden the metal, and it may be softened by reannealing if desired. Material which has been annealed must finally be heat treated to give it the specified physical properties. Either heat treatment or annealing may be repeated as often as desired without harm.

HEATING Means and Methods.—Heating for heat treatment or annealing may be done in a furnace heated by oil, gas or electricity, provided proper temperature and uniformity can be assured and the metal is properly guarded against flames and too hot gases. Heating in an open flame is not satisfactory. A better method of heating, and the one generally adopted, is in a salt bath composed of approximately equal parts of sodium nitrate and potassium nitrate (commercial double refined). This mixture is molten over the temperature ranges used in heat treating or annealing duralumin and affords a clean, rapid and uniform heating medium. A film of salt

will adhere to the parts when they are withdrawn for quenching, but this will be washed off in the quenching water. (Care must be taken to see that all traces of salt are washed off after treatment in the salt bath or corrosion may result.)

CONTAINERS for Salt Bath.—An iron or steel tank, heated by means of oil or gas, may be used for the salt bath. (Carbonaceous fuel, such as coal, coke or charcoal, should not be used, as leakage of nitrates will create an explosive mixture.) Tanks are often made of boiler plate ½ to ¾ in. thick. If tanks contain seams they should be carefully welded, caulked or brazed. In deep tanks, heating should be arranged that the salts will begin to melt along the side, near the top, so that expansion pressures will be relieved. Care should be exercised when adding salt to the molten bath, as the presence of moisture will cause spattering of the hot liquid. It is better to add salts when the bath is cold.

Time of Heating.—For the comparatively light sections used in aircraft work, twenty minutes in the salt bath is generally sufficient time for either heat treating or annealing, and five to ten minutes may suffice for very thin sheet. For bar, forgings or heavy plate the time should be longer. The following formulas have been recommended:

Time in minutes for annealing—80 times square root of thickness in inches.

Time in minutes for heat treating—60 times square root of thickness in inches.

Heating in a furnace may require four to ten times as long as in the salt bath, depending upon circumstances. Parts may be placed directly in the salt bath or furnace at stated temperature without preheating.

Working.—With proper precautions, practically all the fabricating processes which are applied to steel may be applied to duralumin, although some, such as welding, are more difficult and others, such as deep drawing or forming, are more limited.

Machining.—Duralumin may be turned, threaded or machined at about the same speed as brass, kerosene or lard oil being used as a lubricant. It cuts most freely in the hard state, that is, after heat treatment and aging or cold rolling. Duralumin is readily cut on a metal cutting band saw.

FORMING.—Channels and other long sections are made by heat treating a coil of flat strip, rolling to shape immediately, and straightening while still soft, and then allowing to age. This avoids the necessity for heat treating long straight members, which would be difficult. Sheet stock requiring flanging, bending, etc., may be heat treated just before the final forming operation, and allowed to age after forming. If forming is severe it should be done within one-half hour after quenching. Where forming is moderate, one hour may be allowed. If several forming operations are required, or if the forming is severe, the material should be annealed, reannealed if the forming causes it to harden, and heat treated just before or any time after the final operation.

Bending.—In the tempered (heat treated and aged) condition, duralumin sheet or bar ½ in. in thickness or diameter may be bent over a radius equal to twice its thickness, and this factor may be reduced for thinner material.

A manufacturer gives the following table for design or shop practice in the cold bending of tempered (heat treated and aged) sheet. The minimum safe radius of bend is given in terms of the thickness of the sheet. The fourth column, giving equivalent radius in inches, has been added for convenience. Ordinarily, the next larger round number would be used.

MINIMUM BENDING RADIUS—TEMPERED SHEET

T = Thickness in inches.

Thickness, B & S Gage	Inch	Bending Radius	Actual Min. Radius, Inch
No. 30	(.010)	0.8 T	.008
No. 24	(.020)	1.1 T	.022
No. 20	(.032)	1.2 T	.038
No. 16	(.051)	1.2 T	.061
No. 12	(.081)	1.3 T	.105
.....	1/8	1.3 T	.162
.....	1/4	1.4 T	.350
.....	3/8	1.6 T	.500
.....	1/2	2.0 T	1.000

In the annealed state the radius of bend may be approximately one-half that for tempered material, and in the freshly quenched state an intermediate radius should be used.

Bending is done by the same methods employed with other sheet metals, with proper precautions to insure an adequate radius.

Tube Bending.—Tubing to be bent should be annealed, filled with melted rosin, and when the rosin has congealed bent to the desired form. The rosin is then melted out by gently heating the end of the tube with a blow torch, taking care not to overheat the metal nor to melt the rosin in the middle before the ends are clear, as this would burst the tube. Finally, the tube is heat treated. The minimum radius for bending is about three times the diameter of the tube.

A manufacturer has stated that sharp bends in square tubing have been successfully made by filling with a low melting point fuse metal and bending immediately while the tube is still warm.

SPINNING.—The spinning of duralumin sheet has not as yet been undertaken at the Naval Aircraft Factory. It is stated that several commercial spinning companies have been successful in spinning annealed duralumin after their spinners have become familiar with the working of the metal and that they have been able to produce the same shapes that they could get in brass.

Forging.—Duralumin makes excellent plain or die forgings when properly handled. It is somewhat delicate at forging temperatures and sensitive to underheating or overheating, but it is reported that quantity production of forgings has been accomplished without difficulty in ordinary oil or gas-fired semi-muffle furnaces. Forging temperatures between about 660 and 840 deg. Fahr. (350-450 deg. Cent.) are recommended. This is below the color range and pyrometric control of the temperature is essential. Heating may be done in a muffle or semi-muffle furnace or a salt bath, not in an open flame. Heating is much more rapid and more uniform in a salt bath than in a furnace. A film of salt will adhere when the parts are withdrawn, but may be removed by a quick rinse in hot water. The metal is brittle (hot-short) above 840 deg. Fahr. and may become overheated by too rapid working. Light blows and gradual reduction are recommended. About the same power is required as in forging steel and similar dies are used. When the metal becomes cold it gives a decided ring.

Riveting.—Rivets are made cold, from annealed wire, in a rivet heading machine. Rivets are heat treated immediately before use, are driven while still soft, that is, within about 30 minutes after quenching, and then develop their maximum properties upon aging without further attention. Riveters should turn in their stock every half hour, in exchange for freshly treated rivets.

Rivets are sometimes heat treated in small portable electric furnaces near the work. A preferable method, developed at the Naval Aircraft Factory, is to place the rivets of a given size in a steel tube about 1 in. diameter with a 1/16 in. wall, closed at the bottom by welding, and suspend these tubes in the salt bath, so that the rivets will be several inches below the level of the bath. This insures uniform and fairly rapid heating, segregates the sizes, and is very convenient. Thirty minutes is allowed for heating. The contents of each tube is then quenched in cold water, being caught in a wire basket. Rivets may be upset by hand, by pneumatic rivet guns, or by pneumatic compressors. Button head rivets have been found superior to flat head, as the latter have a tendency to crack around the periphery of the head. Cracked heads are sometimes due to longitudinal seams in the wire.

Assembly.—In parts or assemblies which cannot be heat treated as a whole, the individual parts are heat treated and then assembled by riveting.

WELDING.—Duralumin may be welded in the same manner as aluminum,* although somewhat more skill is required on account of the greater "tenderness" of duralumin. Good welds may be made by either the "filled" or the "flange" method, the latter being considered preferable for sheet, as it leaves a fillet on the under side as well as the upper side and is easier to make on thin sheet. The use of a suitable flux is very important. The character of the flux used has a great influence on the quality of the weld. Some commercial fluxes are much superior to others. Napolitan Flux made by the Air Reduction Company, and Welding Flux No. 22 made by the Aluminum Company of America have been found satisfactory.

Welded duralumin parts should be heat treated (all over) after welding, as otherwise there is an increased tendency to corrosion adjacent to the weld. Heat treatment also strengthens the joint.

Welded duralumin joints have about the same relation to the strength of the parent metal as is found in steel welds, a great deal depending on the skill of the worker and the nature of the job. Welded joints should not be depended upon to carry high stresses.†

Soldering.—The soldering of duralumin has not, up to the present time, been found practicable. Aluminum solders and ordinary tin-lead solder may (by suitable methods) be made to give a strong joint in duralumin, but all soldered joints so far tested deteriorate rapidly when in contact with moisture, due to an electrolytic action between the aluminum or duralumin and the solder, so that the joint finally loses its strength. Moreover, the solders will not withstand the heat treating temperature of duralumin, and if soldering is done after heat treatment there is a tendency to anneal and weaken the material.

Bearing.—Duralumin should not be used in rubbing contact against itself, as it has a strong tendency to bind and seize. Brass and hardened steel have been found to possess good bearing qualities against duralumin.

Castings.—Duralumin is not adapted to making castings, as it tends to be porous and requires mechanical working to develop its best properties. (Alloys of somewhat similar composition and sometimes referred to as "duralumin" develop excellent physical properties when properly cast and heat treated.)

Effects of Temperature.—The tensile properties of duralumin are improved at low temperature, and are moderately reduced at high temperatures up to about 300 deg. F. Above this temperature some progressive annealing may take place, so that the material will become weaker with age. This effect increases with higher temperature.

Corrosion.—The statement has frequently been made that duralumin is resistant to corrosion. This statement should be qualified. The material is seriously attacked when in direct contact with moisture, especially salt water, for considerable time. Corrosion is manifested by pitting, perforation, scaling, etc. Where parts are wet for short periods and dry again quickly, as when exposed out-doors, a surface oxidation is developed and corrosion then as a rule proceeds slowly, if at all. When kept dry, as indoors, duralumin will ordinarily retain a bright polish for a long time. Contact with steel, brass and most other metals in the presence of moisture accelerates corrosion.

Protection Against Corrosion.—Spar varnish mixed with 2 per cent to 3 per cent American Blue is a fairly good protective coating for duralumin. The blue facilitates inspection to see that covering is complete, while the coating is not opaque enough to hide surface flaws in the material. Direct exposure to sunlight seems to cause some deterioration of this coating, in time. Spar varnish mixed with a pigment of 12 to 15 per cent aluminum powder, by weight, is a good protective coating when transparency is not required, and it is resistant to sunlight. Red lead ground in linseed oil has also shown excellent results in exposure tests, indicating that ordinary paints containing basic pigments may be used. A heavy oil, a slushing grease or rust preventative, or an asphaltum paint may be used to protect parts exposed to moisture but not to wear, such as the interior of pontoons for aircraft.

Table I

PHYSICAL PROPERTIES OF DURALUMIN

Specific gravity	2.80 to 2.85
Weight, pounds per cu. in.	.100 to .102
Weight, pounds per cu. ft.	173 to 176
Melting range (1000–1200 deg. F.)	540–650° C.
Coefficient of linear expansion per deg. Cent	.0000226
Thermal conductivity (silver 100)	31.
Specific heat	.214

Duralumin is non-magnetic.

MECHANICAL

SPECIFIED VALUES

Heat Treated State:

Tensile strength (min.)*	55,000 p.si.
Yield point (min.)	30,000 p.si.
Elongation in 2 in. (min.)	18 per cent

Annealed State:

Tensile strength (max.)	35,000 p.si.
Elongation in 2 in. (min.)	12 per cent

* Note.—For material over ¾ in. in thickness or diameter, the tensile values in the heat treated condition should be modified as follows:

Thickness or Diameter	Tensile Strength	Yield Point	Elongation in 2 In.
Over .75 in. to 1.5 in., incl.	50,000 p.si.	25,000 p.si.	14 per cent
Over 1.50 in. to 2.5 in., incl.	45,000 p.si.	20,000 p.si.	12 per cent

REPRESENTATIVE VALUES	Heat Treated	Annealed	Hard Rolled
Tensile strength	55 to 62†	25 to 35	67 to 72
Yield point	30 to 36	.....	55 to 65
Elongation in 2 in	18 to 25	10 to 14	3 to 8
	per cent	per cent	per cent
Brinell hardness	93 to 100	54 to 60	130 to 140
Scleroscope hardness	23 to 31	9 to 12	37 to 42

† Strength values in thousands of pounds per square inch.

Compression

Ultimate strength, compression	55,000 p.si.
Yield point, compression	30,000 p.si.

Shear

Ultimate shearing strength	27,000 to 35,000 p.si.

Note: *See "Welding Aluminum in Automotive Parts Manufacture," by H. C. Knerr, AUTOMOTIVE INDUSTRIES, March 29, 1923.

†See "Welding Duralumin," by H. C. Knerr, AUTOMOTIVE INDUSTRIES, May 4, 1922.

Just Among Ourselves

Two-Car Smith and the Saturation Point

TWO-GUN PETE of pioneer days has been replaced by Two-Car Smith in these times of cultured and effete civilization. Two-Car Smith fast is becoming a real factor in estimates being made by economists as to the size of the future market for automobiles. Once upon a time a single automobile in a family was looked upon as a novelty and a curiosity, but more than one man in moderate circumstances now owns two or more vehicles. Only the other day we rode with a man in a humble vehicle of very low-price and were surprised to hear its owner — whom no one would mistake for the Prince of Wales —speak of "my wife's car." Questioning brought the reply, "Sure, I have two cars. Both are cheap cars, but my wife and I can each be where we want to *when* we want to." In addition to the Two-Car Smiths there is a constantly growing number of men who own three, four, and even five cars—and they don't operate fleets for business purposes either. One wealthy man on Long Island owns five cars of the same make the cheapest of which cost over $3,000. Guess that saturation point isn't worth talking about just now!

Guessing Contest Used in Technical Show

GUESSING contests long have been used as a means of attracting people to booths at shows, but usually such efforts have been confined to exhibits designed for the general public and to questions which one man might answer as well as another. The John Illingworth Steel Co. was responsible for an innovation in this line at the Steel Show in Boston last week. It had on exhibition a piece of alloy steel and offered a cash prize to the person who could come the nearest to guessing the proportions of carbon, manganese and alloy contained in the piece. The name and address of the guesser, of course, were required with the guess. The list developed from the contest would seem likely to be of excellent sales value as the very nature of the contest automatically excluded the casual non-technical visitor.

Echoes of Democratic Convention at Show Drawing

SCENE: National Automobile Chamber of Commerce, N. Y. C.

Time: Drawing for space in National shows.

The drawing is in progress, Sam Miles calling the names of the companies and the number of the space each selects.

Miles: "Davis—25."

Facetious executive (sotto voce) "24 for Underwood."

But hardly anybody heard it, so the drawing continued without any violence being done.

Is It Speed That Makes Justice Blind?

A FEW weeks ago we made some rather scathing remarks about the kind of justice that must be meted out in a traffic court which runs through 240 cases in 60 min., as one New York court was reported to have done. It is gratifying to have our opinion confirmed by Magistrate House of the New York traffic court. He had just completed a days work assisting Chief Magistrate McAdoo and and another judge to dispose of 672 cases in one day. He is quoted as saying that "when the calendar is so crowded it is practically impossible to give full justice to those arraigned." Justice is not a question of mere honest intention; it can be achieved only when sufficient time is available for full presentation and consideration of all the facts.

Twenty-Five Years of Progress Completed

THE automobile industry is about to celebrate its Silver Anniversary. It has behind it twenty-five years of constructive achievement which must stand to the everlasting credit of those pioneers who combined their faith with works in the early days of automotive development. Many men prominent in the industry today never had ridden in an automobile a quarter of a century ago, but many others who watched and prayed over the motor vehicle business when it was an infant still occupy positions of prominence. The Silver Anniversary issue of the *Automobile Trade Journal*, which will be published in December to commemorate the birthday of the industry, will give among other things, the interesting story of what some of the leading automotive executives were doing twenty-five years ago. In our own office we find one engineer who has participated in automotive development ever since there was any. P. M. Heldt, engineering editor of AUTOMOTIVE INDUSTRIES, twenty-five years ago was designing the powerplant for one of the first horseless carriages built in this country. He had left Roth Brothers, with whom he had been employed since leaving college, and had joined the Munson Co. at La Porte, Ind., to lay out for Mr. Munson the design of a gasoline-electric car. The design was a success. According to Mr. Heldt its outstanding features can be described in two words—"It ran." A few years later Mr. Heldt became associated with the *Horseless Age*, the first exclusive automotive publication in the world, and in 1917 he joined the staff of AUTOMOTIVE INDUSTRIES, then *The Automobile*.

N. G. S.

New Turret Lathe Has Greater Power and Range of Feeds

No. 1—A Universal Hollow Hexagon turret lathe of Warner & Swasey Co. is featured by an all-steel geared head, an increased number and range of feeds and feed control in the carriage aprons.

TO meet the demand for a turret lathe characterized by great power, rigidity and ease of operation, the Warner & Swasey Co. of Cleveland, Ohio, has brought out a new design, the No. 1-A Universal Hollow Hexagon turret lathe.

The new tool, while similar in most respects to the well known 2-A and 3-A produced for many years, incorporates many improvements, including a new design of all-steel geared head, an increased number and range of feeds, a quick method of changing feeds in the aprons of the carriages, a new patented turret binding mechanism, and new types of advanced tooling. It is claimed that the combination of these features with the well known Warner & Swasey double-carriage design has resulted in a machine capable of high production on a wide range of work.

In Fig. 1 the machine is shown as equipped for bar work. Its capacity through the automatic chuck collet is 2½ in. for round bars, with a maximum turning length of 26 in. Being of the universal type, the machine may be equipped for bar or chucking work with equal efficiency.

Equipped for chucking work, with a 12 in. chuck, the lathe has a maximum swing over the carriage of 13¾ in. and over the ways of 16¾ in. The all-geared head provides proper cutting speeds for the various metals, in small diameter bar work as well as large diameter chucking work.

Ease of Operation

In the design of the new machine, special attention has been given to ease of operation. The changes of feed are located in the aprons, thus eliminating unnecessary effort. The gears in the head are controlled by easily operated levers, reached conveniently from the position of the operator. The power rapid traverse is claimed to greatly reduce the fatigue attending hand movement of the loaded turret. This helps to maintain the operator's efficiency throughout the day, as regards accuracy of product.

A liberal amount of power is provided in the new design, so that full advantage may be taken of the double-carriage principle, which is a feature of all Warner & Swasey turret lathes. Tests of the machine in actual operation over a period of a year are said to have shown unusual power and great accuracy under all working conditions.

To insure the maximum of rigidity, the head of the machine is cast integral with the bed. The gears (Fig. 2) are made of heat treated steel and operate in an oil bath. The system of gearing provides 12 spindle speeds, both forward and reverse, running from 20 to 477 r.p.m. Such a wide choice of speeds is valuable where large and small diameters are to be turned, bored or threaded on the same piece. Starting, stopping and reversing the machine is accomplished through a double friction clutch on the back shaft, as shown in Fig. 2.

Provisions are made for two different motor drives. The motor may be mounted on the head and leg and provided with a belt connection to the single pulley drive, or it may be mounted on the plate on the head end of the machine and the pulley driven through a silent chain. The former is the standard arrangement where the counter shaft is omitted; the latter has the advantage that it keeps the entire motor drive within the floor space occupied by the machine itself.

Hollow, Hexagonal Turret Used

The familiar hollow hexagon turret is used, with broad faces to which tools and holders are bolted from the inside. In order to assure accuracy of alignment the faces of the turret are faced and bored by tools held in the spindle of the machine itself, after final installation of the turret.

The great power of the new lathe involves greatly increased feed pressure by the turret, and to take care of this pressure the turret is clamped in position by a new and patented turret binding mechanism. As shown in Fig. 3, *C* is a two-part collar with a groove which embraces tapered flange *A* on the bottom of the turret and tapered flange *B* on the turret seat. By means of right and left hand screws, manipulated by lever *D*, the two halves of this collar are pulled together and the turret is bound tightly to its seat. The same lever operates the turret lock bolt. The action of this binder mechanism is exceptionally firm, and holds the turret as though cast in one piece with the saddle.

The hollow hexagon turret is equipped with 16 feeds. Eight of these are readily obtained by two levers located in the saddle apron itself. An additional lever operates a change gear located in the gear box at the head end of the machine, thereby making available feeds ranging from 0.0045 to 0.120 in. per revolution of the spindle. It is claimed that the location of the feed changes in the saddle apron substantially reduce the time of changing.

A rapid power traverse has been provided for moving the turret to and from the working position. It cannot be engaged while the turret is under feed, and will automatically disengage as the turret reaches the end of the bed. Reducing fatigue of the operator, the power traverse has proved valuable in helping to maintain operating efficiency throughout the day.

Side Carriage Design

The side carriage is of the familiar Warner & Swasey design; it is mounted on the front "V" and does not extend across the ways. It is accurately gibbed to a lower dovetailed bearing on the front of the bed. This construction gives a firm support to the side carriage and adds to the clearance. The swing of the machine over the side carriage is 13¾ in.

When not in use the entire side carriage may be moved to the left, past the chuck and out of the way of the turret saddle. The swing over the end of the cross slide dovetailed ways is 13¾ in.; that over the carriage itself 16

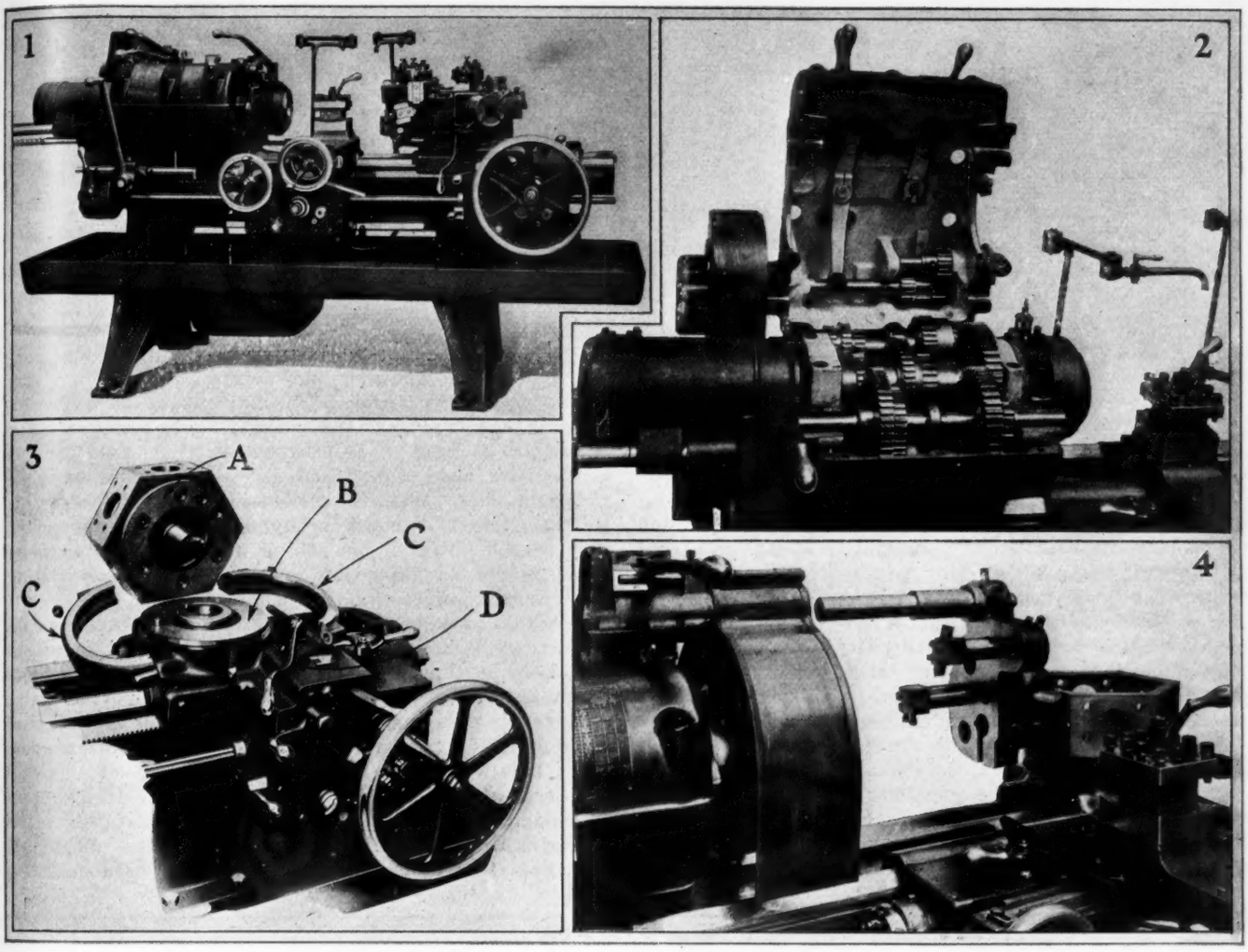


Fig. 1—Front view of No. 1-A Warner & Swasey universal hollow hexagon turret lathe
Fig. 3—New turret clamping mechanism

Fig. 2—Head gears of the Warner & Swasey No. 1-A
Fig. 4—Showing overhead piloted turning tool

in., and over the ways of the bed 16¾ in.

The square turret is mounted on the side carriage and will hold four or more tools. It is indexed without being lifted from its seat, and may be clamped in any position by a quarter turn of the binder head.

Sixteen longitudinal and the same number of cross feeds are provided for the side carriage, which may be operated independently of the hollow hexagon turret carriage. Thus peripheral turning, cross-facing or recessing operations may be performed by the square turret tools at the correct feed, while the hexagon turret is engaged in drilling, boring or turning cuts at a proper feed.

The cross travel of the square turret is 8¼ in. The longitudinal travel of the side carriage is 22¾ in., and this may be extended to a maximum of 30½ in. by removing two of the dogs on the stop roll.

A new overhead piloted turning tool is offered for the first time as a standard accessory. As shown in Fig. 4, the pilot bar is held adjustably in the body of the turning head and enters a corresponding bushing adjustably mounted on the head of the machine. By means of these adjustments any possible loss in alignment may be corrected. The design compensates for the absence of a center pilot bar when the latter cannot be used and is said to greatly increase the rigidity of the machine and tools on extremely heavy work where both center and overhead pilots may be employed.

Balloon Tire Gage

THE Kelly-Springfield Tire Co. has brought out a tire gage for balloon tires which is in the form of machinist's outside calipers and is known as the Kelometer. It serves for measuring or gaging the width of the bulge at the bottom or the tire. Pivoted to one arm of the calipers is a link or cross piece which has a number of holes in its outer end, one for each size of tire to be gaged. A pin inserted through one of these holes and a hole in the other arm of the gage will set the arms the correct distance apart for the corresponding size of tire. The tire must be gaged with passengers or when the car is loaded.

Kelometer tire gage for balloon tires

Round-the-World Flight Proves Reliability of Modern Airplane Design

Practical lessons learned from flight, shown in fliers' statement given to AUTOMOTIVE INDUSTRIES *in Washington. Greater speed would be useful in Arctic flying. Amphibian planes desirable.*

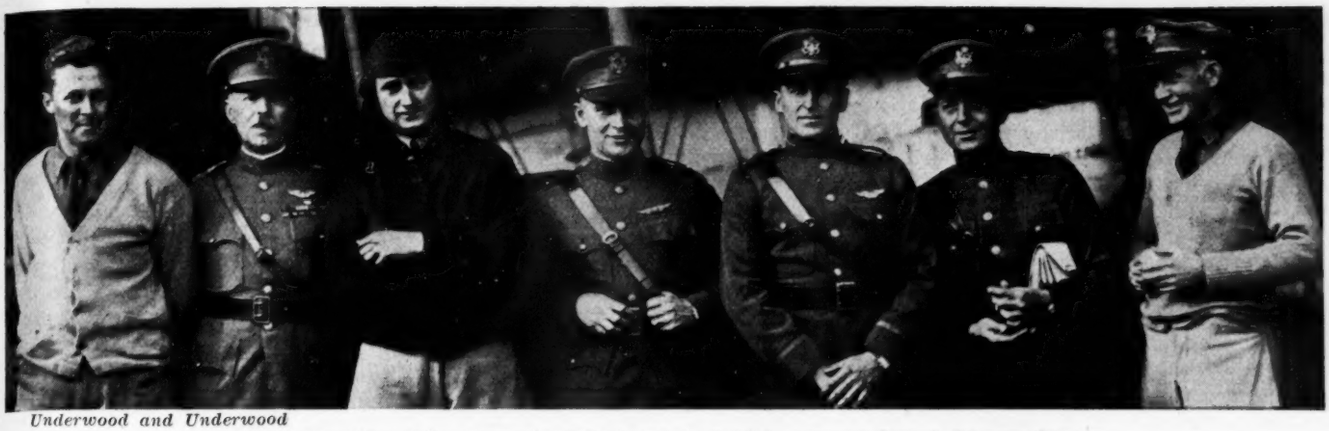
THE Round-the-World Flight was completed Sept. 28, when the six army aviators brought their Douglas cruisers to rest at Seattle, Wash., thus completing their 27,000-mile journey. The romance surrounding their achievement still is being described both orally and in writing. It may form the topic of imaginative tales for years to come. But the practical detailed story of the technical results has yet to be told. Many of the important but more prosaic lessons of the flight cannot be available to the engineering world until the report, in preparation by the War Department, is released some months hence.

In an interview given to AUTOMOTIVE INDUSTRIES when the fliers reached Washington, however, the men who made the trip outlined the major technical lessons to be learned from the trip, and answered a number of questions which are being asked by leading automotive engineers.

Speaking generally, the fliers were well satisfied with their planes, engines and the various pieces of equipment used. Their replies to the questions asked, however, indicates clearly a belief that design alterations would be desirable to meet specific conditions in certain places. They said, for example, that a faster machine than the one used undoubtedly would have had many advantages in overcoming the dangers and delays involved in flying within the Arctic Circle. The advantages of a greater cruising radius under these conditions, however, they do not regard as great. Their statement, as released through C. P. McDarment, First Lieutenant Air Service, says, on this point that, "With the means available for forecasting weather at various places throughout this particular route, it is very doubtful if a machine with a greater cruising radius would have been able to take advantage of existing good weather, were it not possible with the present airplanes. A greater cruising radius undoubtedly would have a great many advantages. For instance, it might have been possible to have flown the entire distance from Reyjavik to the coast of Labrador, obviating the necessity of arranging the intermediate places of the inaccessible coast of Greenland, or to have flown the Atlantic in one hop. This would have obviated the necessity of choosing the hazardous and longer route by way of Iceland and Greenland. Another distinct advantage of a faster plane is that its flying entails much less fatigue of personnel than does the plane of the type that was used. Such a

Itinerary, Dates and Distances Negotiated

Miles	Bases	Stopping Places	Date*	Incidents**
0		Santa Monica	March 17	
350		Santa Monica-Sacramento	March 17	
375		Sacramento-Eugene	March 18	
45		Eugene-Vancouver	March 19	
195		Vancouver-Seattle	March 20	
650	†	Seattle-Prince Rupert, B. C.	April 6	New motors installed. Pontoons added.
300		Prince Rupert-Sitka, Alaska	April 10	"Seattle" makes needed repairs.
610	‡	Sitka-Seward, Alaska	April 13	Heavy gales and snowstorms.
450		Seward-Chignak, Alaska	April 15	"Seattle" forced down.
400		Chignak-Dutch Harbor, Alaska	April 19	"Seattle" hits mountain; destroyed.
350	†	Dutch Harbor-Atka Is., Alaska	May 3	Bad weather. Spent night in planes.
530		Atka Is.-Attu Is., Alaska	May 9	
860	‡	Attu Is.-Paramashiru, Japan	May 16	Flight through fog.
510		Paramashiru-Yetorofu, Japan	May 19	"New Orleans" forced down. Repaired.
475		Yetorofu-Minato, Japan	May 22	
395		Minato-Kasomiga Ura, Japan	May 22	Change pontoons and engines.
360	†	Kasomiga Ura-Kushimato, Japan	June 2	"Chicago" repaired.
380	‡	Kushimato-Kagoshima, Japan	June 3	
610		Kagoshima-Shanghai, China	June 5	
550	‡	Shanghai-Amoy, China	June 8	Three planes hastily overhauled.
300		Amoy-Hongkong, China	June 9	
500		Hongkong-Hai Phong, French Indo-China	June 10	Booster radiators installed.
395		Hai Phong-Tourane, French Indo-China	June 12	"Chicago" has new engine installed.
530		Tourane-Saigon, French Indo-China	June 17	Light air. Less fuel carried.
675	‡	Saigon-Bangkok, Siam	June 19	
450		Bangkok-Rangoon, Burma	June 21	"Chicago" flew on battery.
445		Rangoon-Aykab, Burma	June 26	Chinese sampan bumps "New Orleans."
400		Aykab-Calcutta, India	June 27	Fly for seven hours over jungle.
475	†	Calcutta-Allahabad, India	July 1	Change to wheels. New motors.
510		Allahabad-Ambala, India	July 2	"New Orleans" cylinder leaking.
305		Ambala-Multan, India	July 3	Lieut. Smith injured. Continues.
475		Multan-Karachi, India	July 4	Encounter desert sand storm.
330	‡	Karachi-Charbar, Persia	July 7	"New Orleans" cracked water jacket.



Underwood and Underwood

Lieut. Harding, left; General Patrick, Lieut. Smith, commander of the squadron; Lieut. Wade, Lieut. Ogden, Lieut. Arnold and Lieut. Nelson at Mitchel Field

plane, capable of operating at a higher speed and carrying pontoons for flying over water instead of the regular landing gear for overland flying, was not available at the time the world flight started."

Even though other makes and types of motors were available, which would give more power per unit of weight and consume less fuel, none of these engines have been able to take the place of the Liberty motor in the preference of our pilots. The Liberty engine has been in continual use in the air service for seven years. It has been improved upon from year to year until at the present time it stands almost foolproof.

Many Propeller Changes Necessary

Many propeller changes were necessary during the world flight. Consequently, the fliers were asked if certain metal propellers might not have been more satisfactory than the ones used. Their statement, in reply, says that before the type of propeller used was selected, a great number of different designs were tried, among which were numbered both steel and duralumin propellers. In their present state of development these latter types were found to be unsuited for the dual purpose of lifting great weights and of obtaining a maximum speed for the power developed in the air. The metal propellers as at present designed are essentially for speed work and have few qualities which would recommend them for heavy duty such as those subjected to on this flight. The propellers actually used on the flight, although they were the outcome of army design at McCook Field, were sheathed with brass in accordance with the practice of the navy.

Motors capable of being "top" overhauled instead of replaced by the personnel of the expedition might have cost less to maintain, the statement continues, if the ele-

in the Round-the-World Flight

330		Charbar-Bender Abbas, Persia	July 7	Stop here for new oil, on account of heat.
400		Bender Abbas-Bushire, Persia	July 8	
475		Bushire-Bagdad, Iraq	July 8	
480	‡	Bagdad-Aleppo, Syria	July 9	
585		Aleppo-Constantinople, Turkey	July 10	Attain highest speed of trip.
290	†	Constantinople-Bucharest, Rumania	July 12	
650		Bucharest-Vienna, Austria	July 13	
650	‡	Vienna-Paris, France	July 14	
225		Paris-London, England	July 16	
155	†	London-Hull, England	July 17	
370	†	Hull-Kirkwall, Scotland	July 30	New engines installed.
525		Kirkwall-Hofn Hornafjord, Iceland	Aug. 5	Flew in fog, following coast line.
349		Hofn Hornafjord-Reykjavik, Iceland	Aug. 5	"Boston" lost.
985	‡	Reykjavik-Greenland	Aug. 14	Planes damaged by ice.
612	‡	Greenland-Labrador	Aug. 31	New engines installed.
290		Labrador-Newfoundland	Sept. 1	Fight heavy head winds.
420		Newfoundland-Nova Scotia	Sept. 3	Lieutenant Wade rejoins flight.
520		Nova Scotia-Boston	Sept. 4	Forced down by fog at Maine.
175	‡	Boston to New York	Sept. 9	
220		New York-Washington	Sept. 9	"Chicago" forced down by stripped gear.
400		Washington-Dayton	Sept. 13	Reduced lifting power changes route.
240		Dayton-Chicago	Sept. 15	Engines changed.
440		Chicago-Omaha	Sept. 16	
210		Omaha-Dallas	Sept. 18	
540		Dallas-El Paso	Sept. 19	
400		El Paso-San Diego	Sept. 20	
150		San Diego-Santa Monica	Sept. 23	Flew against head winds.
333		Santa Monica-San Francisco	Sept. 25	
460		San Francisco-Eugene	Sept. 26	"Boston" forced down.
240		Eugene-Seattle	Sept. 28	

Note: † Indicates Main Supply Bases. ** Incidents occurred either in former-mentioned place or between it and the latter.
‡ Indicates Minor Supply Bases. * Dates indicate departure from latter-mentioned places.

ment of time did not have to be considered. Completely replacing a motor after it had begun to lose its efficiency was found to be more satisfactory. The air service had a vast quantity of Liberty motors in stock, 75 of which were brought up to the specifications of Round-the-World flight, and except for the transportation to the depots along the route it was just as cheap to put in new motors as to take time to repair the old ones. This method of maintenance might not be feasible or economical for commercial companies to carry out, but for an expedition with limited facilities and where saving of time was essential no other program could be considered.

Rapid changes in climate encountered during the world flight necessitated radiator changes and other alterations, and some observers have been inclined to think that an air-cooled radial type of engine developing a horsepower output similar to that of the Liberty would have been more suitable than the unit used. The fliers' statement on this point says that a motor which would operate equally well under all conditions of atmosphere and temperature was not available for the flight. The all-metal amphibian type of airplane would be ideal for a world flight, in the opinion of the aviators, but such a plane has not yet been perfected. Its chief advantage would be its ability to operate either as a land or sea-going machine without necessitating changes in structure. A great many planes of this type have been built, but very few have been tested in service long enough to warrant their use for an expedition so difficult as the Round-the-World flight. Designers and engineers have been looking forward to the development in the near future of a satisfactory all-metal amphibian plane, the fliers' statement continues, but because of certain untried qualities of steel construction very few planes embodying these new features have yet been given their service tests. The machines used on the world flight were subjected to much more severe tests than those encountered under ordinary modern service conditions. The air service, therefore, has placed its reliance in tested and tried equipment to insure the success of the flight.

The Round-the-World flight has not opened up any new routes. It has illustrated, however, the general adaptability of aircraft to operation in any climate or terrain. Undoubtedly some of the routes followed by the world cruisers will be flown in future by airplanes carrying the world's commerce. In fact, a part of the route taken in Europe is covered by the efficient and successful air lines operated under British and French subsidies. Air routes, like rail routes, will be developed in the future as a result of a distinct and definite need for this means of transportation, and it is hoped that the Round-the-World flight will more fully demonstrate to the world that the airplane is equal to any and all conditions under which it may be forced to operate.

Winning French Machine Carries 12 Passengers

A FARMAN monoplane called the "Jabiru" equipped with four Hispano-Suiza 180-hp. engines, recently won the first prize of 300,000 francs in the French commercial airplane competition, the average flying speed maintained over a distance of 1920 miles being 111 m.p.h.

There were in this event three planes built by Farman, Bleriot and Caudron, the first having Hispano-Suiza and the two latter Salmson engines. Government requirements called for carrying a minimum of eight passengers weighing 176 lb. each, 44 lb. of baggage per passenger, a crew of three, sufficient fuel for a distance of 310 miles against a headwind of 22 m.p.h., and a wireless installation. The passenger cabin had to have a height of at least 70 in., the seats had to face forward and have a minimum width of 20 in., with a passageway of 15¾ in.

Doors had to be capable of being opened from the ground or in the air, this latter with a view to the possible use of parachutes, and the pilot's house had to be separate from the passengers' cabin and open only from the pilot's side. Under the general air regulations in force in France, each machine was required to have double control, a navigator's post, fire fighting apparatus, an adjustable tail, and gas tanks capable of being cast adrift in case of necessity.

The competition began with a series of figure 8 flights during which each of the four engines had to be shut off successively, and started up again without landing. Following this, each machine had to make the round trip from Paris to Bordeaux, three times, with a stop of 45 min. at Bordeaux. Awards were based on average speed, the official time including starting the engine cold.

The winning Farman has a spread of 62 ft., wings having a maximum thickness of 24 in. and a maximum depth of 16 ft., both thickness and depth decreasing toward the wing extremity. Total wing area is 872 sq. ft. The central fuselage provides for 12 passengers and is flanked to left and right by an engine nacelle each of which contains a pair of Hispano-Suiza engines arranged in tandem, driving a propeller of 98 in. diameter. Weight of the plane empty, with water and wireless equipment, is 7590 lb., and weight of fuel, crew and useful load is 3914 lb., giving a total weight in the air of 11,504 lb.

Two views of the Farman monoplane which won French commercial airplane competition

WHILE the automotive industry is celebrating its silver anniversary this year, Rensselaer Polytechnic Institute is completing the 100th year of its existence. The Troy institution is the oldest strictly technical school in the United States and has contributed trained men to nearly every branch of modern engineering. The interesting story of its foundation, growth and achievements is told by Ray Palmer Baker in "A Chapter in American Education" just issued by Charles Scribner's Sons.

~ Editorial ~

Stop Jangling!

THE manufacturers' and dealers' associations have disagreed about the advisability of advocating that the car of a reckless driver be impounded after the owner's third offense. Representatives of the retailers claim that such an idea puts the automobile in the class of revolvers and other dangerous weapons, that impounding of a car takes away the dealer's security when he sells a vehicle on time and that the proposal should be opposed rather than advocated by the automotive industry. The measure would transfer the guilt from the driver to the machine, the dealers say.

The manufacturers' committee, on the other hand, feels that something must be done to stop accidents at any cost and that impounding the cars of speeders offers a practical means of driving sense into the heads of reckless owners. They point out that fines haven't done much good. Jail sentences have more effect, but it has been difficult to get speeders actually locked up. It a man's car be taken away from him for a period, the manufacturers believe, he will feel its loss very sharply and will be more likely to handle it properly when he gets it back again.

THERE can be little doubt that the manufacturers are right when they say that the reckless driver must be curbed, however stern may be the measures needed to do so. The sales resistance being built up by the growing accident list is greater than any likely to accrue from drastic means of preventing irresponsible speeding.

The proposal to impound cars does not transfer guilt from the driver to the car nor put the automobile in the class of dangerous weapons, because the proposal is to return the vehicle to its owner when the court is convinced that he is likely to be careful in his handling of it. The only way the automobile can become associated with dangerous weapons in the public mind is through propaganda and publicity designed to create that impression.

THE argument that impounding a car will endanger the security of the dealer who sells cars on time doesn't sound logical. A car during the period it is impounded, as a matter of fact, probably is a good deal safer and better as security than if a careless owner is driving it about the streets. Impounding would not change the ownership of the vehicle.

But whether or not there should be impounding is not the main thought back of these paragraphs. The point is this: Regardless of the relative merits of the case, isn't it plain that the entire question might better have been argued within the confines of the industry through the Motor Vehicle Conference Committee rather than aired in the public prints. The industry has nothing to gain from wrangling with itself in public.

SIMILAR difference of opinion bids fair to arise as regards compulsory insurance. The Motor Vehicle Conference Committee now is engaged in a thorough analysis of this subject.

The chairman of the N. A. C. C. committee on traffic and accidents said recently: "Whether or not such a plan would work out is a question. . . . It is doubtful whether it would reduce automobile accidents." The trend of his remarks indicated that the manufacturers will not favor compulsory liability insurance in this country, but his statements were so modified as to express openmindedness should further facts be developed which would tend to alter present conclusions. Then, almost immediately following, the assistant general manager of the N. A. D. A. came through with the statement, quoted in the New York *Journal of Commerce*, that he "strongly advocates laws to compel drivers to insure their cars."

IT is to the best interests of everybody in the motor vehicle business and of the public at large that the industry discuss automotive problems within its own family before laying its conclusions before the bar of public opinion. This practice need not hinder the free expression of opinion by individuals at any time, but it would hold back official statements until after full discussion within the industry.

Publicity is pitiless. Public fights over measures of importance to the industry as a whole are justified only after sincere efforts have been made to settle differences by the conference method. A good fight is necessary and beneficial on occasion, but the country will gain no very favorable impression of the industry if it insists on "jangling" publicly over every question which comes up.

Our Industry Today—

October Opens with Plant Operations Maintained at September Rate — Uncertainty Marks Development of Sales Volume

NEW YORK, Oct. 6—Schedules in automobile producing plants are being maintained at the September rate of operations with the possibility that they may be increased later in the month. Manufacturers are not fixing definite programs, however, due to the uncertainty of immediate development in sales volume. Present indications do not point to a marked movement forward in buying until after the election, at the earliest.

Buying is steady but not featured by unusual strength. The farmer is showing interest in new cars but he has not yet made purchases in any number nor is it expected now that as a new car buyer he will develop into an important factor until early next year. His disposition to purchase used cars, showing itself in sections where agricultural depression has been the greatest, is indicative of his conservatism and his sustained interest in the automobile. It is taken an an indication of his readiness to become a new car purchaser as soon as he finds himself on a firm financial footing.

Although production totals are not equal to those of 1923, the year so far is not falling behind the expectations of producers. The marks of 192 are being exceeded and no discouraging aspects are presented through a comparison of the figures of last year and this. Three-quarters of this year have produced 2,542,684 passenger cars compared with 2,741,764 for nine months last year.

No Chance for Record

In the full twelve months of 1923, passenger car production amounted to 3,637,216, a figure that will not be reached this year, not only because output has been lighter but because fourth quarter operations will not be pushed as they were a year ago, when it was felt that heavy demand the first quarter of the following year necessitated large stocks in the hands of dealers. Such heavy stocking as took place a year ago will be absent in the next three months due to the desire of the industry to avoid any such condition as developed in the spring of 1924.

The showing that has been made by the industry this year is, in fact, very satisfactory. Only with the continuance of exceptional conditions such as existed throughout 1923 was it possible for the present year to reach that year's 4,000,000 car and truck production figure. Moreover, uncertainty in general business conditions proved somewhat of a sales resistance this year and this factor was not presented at any time in 1923. It is very likely that this year total production of motor vehicles will mount to 3,500,000, which is all the industry as a whole looked for at the beginning of operations the first of the year.

Detroit Marks Time Awaiting Election

Feeling That Better Buying Movement Will Develop After Political Battle

DETROIT, Oct. 6—Factory operations are continuing at much the same rate as for the past two months, slight changes in schedules either upward or downward being shown in any of the plants. Little deviation from this level is expected during the remainder of the month, the industry as a whole contenting itself with meeting retail requirements, and waiting for a better buying movement to develop.

Closed cars are meeting steady demand, the largest part of the present buying representing a changing over of open car owners to closed models. Throughout the industry the percentage of closed car output is increasing. This is particularly true of companies which have recently introduced low priced closed models and have a large volume of orders on hand from dealers for demonstrating models.

Continued reduced operations of major plants is ascribed generally by executives to the holding off attitude of owners who are making present vehicles do until there are definite indications of resuming business activity. This attitude is due in large part to the usual preelection caution, according to the industry's interpretation, and will clear away quickly when the votes are counted.

Reorganizations Planned

Reorganization of two smaller companies is reported under way, in both of which the control will pass entirely from present managements. These companies, according to the plans as outlined, would be placed in strong financial position and organized on limited annual production basis designed to give them a solid place in the industry. The new backing for these companies would come largely from outside the industry, indicating confidence in the possibility of smaller companies showing handsome returns if properly managed.

The announcement of these reorganizations is expected to come within a short time. There is a possibility of the two companies being combined into one new company, a movement along this line being considered in the early part of the year but being delayed.

Business for Parts Makers

Some further strengthening of other companies is looked for through alliance with unit parts makers. A number of companies which have been manufacturing their own units are negotiating with parts makers to supply them, confining their own operations to assembly and body work. By turning to the unit makers, it is pointed out, they will be in position to remodel their lines without extensive outlays for new manufacturing equipment, and will have the use of the main part of their capital for sales promotion.

Industry Buys Heavily in South's Lumber Marts

ATLANTA, GA., Oct. 6—Sales of southern hardwoods used by the automobile and body trades have, during the past month, continued to maintain the improvement noted early in July, according to manufacturers operating in the Atlanta lumber market, with September sales the largest of any previous month this year.

The betterment, however, during September was not proportionately as large as in August, due to the fact that most manufacturers are wanting spot delivery, and showing little tendency to stock very far ahead. However, the business as a whole is excellent in ash, maple and elm items, and bids fair to continue so the rest of this year, as judged from the volume of inquiries that are being received.

Prices are maintaining the same schedule, but generally showing a slightly stronger tendency, with a less wide range than heretofore. No price changes of consequence, however, are looked for.

Demand for Labor Slows in Cleveland Territory

CLEVELAND, Oct. 6—The labor index for this territory, covering the body building and automotive accessories lines, does not show as well as had been expected on the reported demands for workers. In fact, the reports indicate a dropping off over the number of new men hired in August, taking these lines as an average. However, interwoven into the report are found some cases where individual industries did employ

Chicago Zone Stepping Up Production

more new workers during September than for the previous 30-day period.

Manufacturers in this district continue their belief that the next few months will see an unusual demand for closed jobs, even out of proportion to the general percentage for this season of the year. This opinion is based upon reports which have been coming to the builders from their distributors all over the country, the southern and western districts included.

Checking the reports of economists to the effect that the country is about to enter upon a cycle of industrial building, we find that the automobile plants in the Cleveland district contemplate doing their share of factory building during the next twelve months. The general opinion is expressed that about 80 per cent of the plants will have to make factory additions to care for production demands, and to make up for the lapse in this type of construction for the last few years.

Midwest Cautious Despite Big Orders

Plants Will Not Build Up Factory Organizations Beyond Points of Safety

CHICAGO, Oct. 6—Automobile factories of this section for the most part are interested at the present in adjustment of schedules in such a manner that the demands of the immediate market may be more promptly supplied without building up factory organizations beyond the point of safety. The policy of conservatism and sure-footedness, proclaimed quite generally in the summer, is evidently not to be abandoned, even though heavy order lists might make violations of this rule very tempting.

Some Behind in Orders

Behind on orders as some of the producers are, they doubtless feel the urge to step up output in accordance with their enthusiasm, but they are all sitting in cold judgment on the situation and there is a popular determination not to take chances on uncertainties. So, while some of the companies are going comparatively strong at present, one or two expecting to break all records on the last quarter's business, what increases are made in production will be brought slowly and gradually into force. There is no desire to build up factory forces for top-speed action just for the benefit of business now in sight, large though the present demand may be.

Even in the instance of Nash, which finds itself much oversold, it has been announced that the emergency will be met with gradually increased factory activity. Nash, incidentally, will be obliged to put on considerably pressure for an indefinite period and its daily output now is not far below the 200 car a day mark. Both the main factory at Kenosha and the plant in Milwaukee are working at capacity on present organizations to meet the demand and measures will be taken to enlarge output at both places.

An instance of the typical policy of conservatism in the face of good present business is found at the Velie plant in Moline, where the current rush is handled by day, night and Sunday shifts and overtime. Velie, true enough, has been adding to forces and will continue to add, but like all other automobile producers of this zone, Velie is concerned chiefly with supplying the wants of the trade and not oversupplying it.

Notwithstanding the fact that business with the automobile factories ranges from good to excellent, as they are producing the first consignments of the 1925 models, it is generally conceded to be very speculative as to in what proportions the present volume will continue. It is pointed out that the introduction of new models always is followed by a pick-up in retail sales but that the stimulus of new offerings soon loses force and business thereafter must depend on more normal influences.

"New Model Spurt"

One factory executive calls the present season a "new model spurt" which tells nothing about what will come later on. It is generally hoped that the present month will witness a turn for larger retail sales.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, Oct. 8—The most conspicuous feature of last week's business developments was the sharp rise in the price of wheat. On Monday of this week wheat for May delivery sold as high as $1.57 a bushel, the highest figure since 1920. Prices of oats, rye and barley are also the highest in recent years.

The production of pig iron in September amounted to 2,016,275 tons, comparing with 1,887,145 tons in the preceding month and 3,125,512 tons in September last year. The average daily output was 67,209 tons, as against 60,875 tons in August and 104,184 tons a year ago.

Car loadings in the week ended Sept. 20 numbered 1,076,553, a new high record for the year, and higher than any ever reached in a similar period. The total compares with loadings of 1,061,424 cars in the preceding week and 1,060,811 a year before. Loadings of miscellaneous freight and merchandise and freight in less than carload lots established a new high record for all time.

The production of crude petroleum in the week ended Sept. 27 averaged 2,024,350 barrels a day, comparing with a daily average of 2,038,850 barrels in the preceding week and 2,220,250 in the corresponding period last year. The only increases from the week before were reported in Texas and the Gulf Coast.

Business failures in September, as reported by Dun's Review, were fewer than those for any previous month this year. The total was 1306, which compares with 1520 in August and 1226 in September a year ago. For the first nine months of 1924 the total was 15,226, as against 13,500 in the corresponding period last year.

Fisher's index number of wholesale commodity prices stood at 150.5 last week, the highest level recorded since last March. It compares with 147.8 in the preceding week and 147.3 two weeks before. Bradstreet's monthly index on Oct. 1 was 12.9987, the highest since the first of February and 1.5 per cent above the previous figure.

Buying Power of Farmers Reviving in Northwest

MINNEAPOLIS, Oct. 7—Distributors of automobiles are more generally oversold this fall than ever before. This is an indication of the gradual returning buying power of rural districts on which the Twin Cities depend largely for their car sales. Opening of banks and reopening of banks are a great help and also a tonic to the general feeling.

North and South Dakota and eastern Montana are showing good comebacks after depression from the farmer situation. Southern Minnesota is doing well, but that is a diversified farming community and no such evident return will be registered as in the grain states, which are not yet diversified enough to avoid swings of optimism and depression as goes the crop and prices.

Permanent top cars and closed jobs have the run this year in at least 80 per cent of the sales. Medium price cars rule in favor.

The used car situation is improved as to the basis of trade-ins but there are still some shoppers to contend with. Dealers find money easier and bankers are favoring them again for loans.

Graham Taken Over As Dodge Division

Truck Company, However, Will Continue to Maintain Separate Identity

DETROIT, Oct. 6—Through acquisition by Dodge Brothers, Inc., of control of Graham Brothers, that company in the future will be operated and known as a division of Dodge Brothers, according to an announcement which is being made this week.

So far as the general operations of the Graham company are concerned the change is largely in form rather than in effect, the company maintaining its own organization and identity.

In the announcement to dealers of the change, F. J. Haynes, president of Dodge Brothers, says:

In 1921 Dodge Brothers became the exclusive marketing organization for Graham Brothers trucks. Since that time these trucks have demonstrated that they possess the merit required of a product associated with Dodge Brothers' name.

Dodge Brothers' confidence in Graham Brothers, as well as in the product, has prompted the action that has brought about a closer union between the two organizations. Although Graham Brothers will be known and operated as a division of Dodge Brothers, it will continue as a separate unit maintaining its own organization and individual identity.

Has Been Identified with Dodge

The Graham company has been closely identified with Dodge since its inception, entering the truck field from the commercial body field. It employed Dodge Brothers units as the principal features of its chassis construction and sold exclusively through the Dodge dealer organization.

Its principal factories are at Detroit and Evansville, Ind., the latter being the body building headquarters.

The Graham trucks are made in three chassis models—1-ton, 1½-ton and a special bus chassis on which it mounts its special sedan bus. Dodge Brothers commercial car is mounted on the regular passenger car chassis, with minor modifications for commercial usage and is rated at three-quarter ton.

With the Graham line the company has full representation in the commercial car field up to 1½ tons.

AMERICAN STEAM TRUSTEE

ELGIN, ILL., Oct. 8—The Chicago Title & Trust Co. has been appointed trustee of the American Steam Truck Co. by H. A. Parkin, referee in bankruptcy. This selection came as a compromise when rival factions failed to agree. The action does not interfere with the plans to lease a portion of the plant to a Milwaukee firm. The operation of the truck company will continue as in the past, but efforts will be made to increase its output and realize dividends for the stockholders.

ROUND-WORLD PLANE PRESERVED AS RELIC

WASHINGTON, Oct. 8—One of the two original planes which completed the round-the-world flight is to occupy a position of honor in the Smithsonian Institute, alongside of the two automobiles which are now housed in the Institute, as a relic.

The flagship "Chicago," used by Lieut. Lowell Smith, the War Department announces, will be flown to Dayton, Ohio, and there taken apart.

This is being done in order to afford the air service an opportunity to make a minute examination of all parts to determine the wearing quality of metals, wood and cloth in hot, temperate and cold climates. Later it will be reassembled and brought here.

Sale of Columbia Plant Will Be Held Oct. 21

DETROIT, Oct. 6—By court order the plant and property of the bankrupt Columbia Motors Co. will be sold at public auction at 10 a.m., Tuesday, Oct. 21, at the plant.

The property for sale includes inventories, equipment, etc., appraised as of Aug. 1 at $450,235, and real estate investments covering the equity of the bankrupt in the real estate over incumbrances, appraised as of Aug. 1 at $469,745.

The property will be sold in three parcels or in entirety.

Doehler Will Transfer Operations to Batavia

NEW YORK, Oct. 6—The Doehler Die-Casting Co. will abandon its Brooklyn plant at Court and Ninth street and will transfer its manufacturing activities to Batavia, N. Y., where it recently purchased for a nominal sum the plant of the Batavia Rubber Co.

The newly acquired plant adjoins the original unit of the Doehler company in Batavia. The Brooklyn plant will be sold. President H. H. Doehler declares that the move will bring about economies in operating costs that will aggregate $250,000 annually.

STERLING-KNIGHT OUTLETS

WARREN, OHIO, Oct. 7—The Sterling-Knight Co. reports that new distributing agencies have been established recently in 13 important centers and that additional outlets will be opened up. Demand is increasing and production schedules are being stepped-up as a result.

Ford Sales Manager Is Visiting Europe

Production Manager Accompanies Him—Export Situation Being Checked Over

DETROIT, Oct. 4—W. A. Ryan, sales manager of Ford Motor Co., is now en route to Europe, where he will make an extended study of the general business situation, visiting all countries, particularly those in which the company has assembly plants or sales branches. He is accompanied on the trip by Frank Hadis of the production department of the company, who will inspect the production facilities at the foreign plants.

The departure of Mr. Ryan for Europe coincident with the fact that the sales situation in the Asiatic and Southern Pacific districts is being studied by another official in the sales department, indicates that the company is maintaining the most intimate touch with conditions in the export field. As the extent of Ford distribution abroad is being steadily widened, the personal visits of the sales executives is not taken to mean anything further than that the general export situation is being checked over.

It is expected that Mr. Ryan will spend some time in the British Isles in view of the possibilities of expansion by the company of its manufacturing facilities there. The Ford company of England is to all extents and purposes a British manufacturer. Though the recent repeal of the McKenna tariffs has been a matter of great interest to the company, its most vital concern in England is with the horse-power tax. It has been stated previously that the building of the proposed new Ford plant near London hinges to a large extent on the horse-power tax attitude.

Head of American Bosch Tells of Merger Details

NEW YORK, Oct. 6—Details of the plan whereby it is hoped to consolidate Gray & Davis, Inc., with the American Bosch Magneto Co. are given in a letter which President A. T. Murray of the latter company has sent to shareholders of Gray & Davis. The offer is 3¼ shares of American Bosch for one share of Gray & Davis preferred and one share of American Bosch for 7½ shares of Gray & Davis common.

Holders of Gray & Davis, however, have two options. One is to receive in liquidation about eight shares of American Bosch for each 60 shares of Gray & Davis common, and the other to receive 19 shares of American Bosch for $350 in cash and 60 shares of Gray & Davis common. The latter plan calls for the formation of a new company to take over the entire assets of Gray & Davis. The latter option must be definitely accepted in writing before Oct. 15 or the option will expire.

Agitation Under Way to Abolish Car Tax

C. C. Hanch of N. A. C. C. Writes to Congressional Candidates —A. A. A. Acts

NEW YORK, Oct. 7—Abolition of a 5 per cent war tax on passenger cars by the next Congress is the definite aim of both the National Automobile Chamber of Commerce and the American Automobile Association.

The A. A. A. is urging its affiliated clubs to take action that will bring about this relief, while the N. A. C. C. this week, through its Taxation Committee, of which C. C. Hanch is chairman, has opened fire upon Congressional candidates by urging the elimination of these war measures.

In its appeal to its clubs the A. A. A., over the signature of General Manager Ernest N. Smith, points to the effective campaign waged at the last session of Congress, which resulted in the reduction of the "nuisance taxes" on tires, tubes, parts and accessories from 5 to 2½ per cent, and the elimination of the 3 per cent tax on trucks $1,000 and under and truck bodies $200 and less, and states that now the 5 per cent tax on passenger cars must go as well. This legislation is saving motorists $25,000,000 yearly, it figures, and before it had been wiped out $575,000,000 had been paid in this form of taxation.

Letter to Candidates

Mr. Hanch has sent to Congressional candidates the following letter:

It is six years since the end of the war, but there still remain on the statute books some discriminatory war excise taxes, which constitute a special burden on certain industries and their customers. That these are war emergency measures is evidenced by the repeal of many similar taxes in the past four years.

Among those remaining are the automobile taxes. Congress in its last session, recognized the unfairness of these special levies by giving some relief on parts and accessories and low priced motor trucks, but has given none on the remaining trucks and passenger cars. This burden rests on the owners of 15,000,000 motor vehicles in the United States, one third of whom are farmers, as many more of whom are in industry, small merchants and men of moderate means.

We believe that this will appeal to your judgment as an unfair condition and we hope that when tax reform again comes before Congress you will urge elimination of all of these war measures.

Nash Reports $1,205,766 Net Income for Quarter

NEW YORK, Oct. 7—Declaring the regular quarterly dividend of $1.75 a share on the preferred stock, payable Nov. 1 to stock of record Oct. 20, directors of the Nash Motors Co., meeting in the East, announce that net income for the third quarter was $1,205,766, after all charges and reserves for taxes.

This compares with $2,257,767 in the corresponding quarter last year. The third quarter will give stockholders $3.40 a share, against $4.48 in the previous quarter and $7.22 last year.

For the nine months ended Aug. 31, net income was $4,325,241, equal to $12.81 a share on the common, after preferred dividends. In the corresponding period last year net income equaled $20.25 a share on the common.

The Nash company, which is celebrating its eighth anniversary, also reports that in its eight years of operation it has built more than 250,000 Nash cars and trucks, with an aggregate value of $310,000,000. Its first financial statement showed total resources of $7,000,000, while today they are nearly $42,000,000. For the first eight months of this year sales volume was $29,738,154.

ROAD CELEBRATION PLANNED

RENO, NEV., Oct. 8—Plans have been completed for a great transcontinental highway exposition which is to be held here early in the summer of 1926 to celebrate the completion of the first improved highway across the continent.

Conditions in Europe Now Are Not Such as to Offer Outlook for Big Sales of American Cars

AN INTERVIEW WITH RODOLPHE STAHL,
Chief Engineer of the Gray Motor Co.

By D. M. McDonald,
Detroit News Representative of the Class Journal Company.

Detroit, Oct. 8.

CONDITIONS in Europe, though very much on the up-grade, do not portend a large volume of business for American automobile manufacturers, according to Rodolphe Stahl, chief engineer of the Gray Motor Co., though a good automobile business will undoubtedly continue with those countries in which American cars are not made practically prohibitive by taxes.

Mr. Stahl is back after an eight weeks' tour of England and several Continental countries, during which time he visited and studied conditions in leading centers. From an engineering point of view, Europe has little to offer to the American industry, Mr. Stahl said, several body types in which he was interested proving impracticable for use here, and a number of other features of European engineering being similarly unadaptable.

So far as the general business in cars in England is concerned, said Mr. Stahl, the demand will continue for light cycle cars as long as the horse power tax continues in effect. There will be some sale for American cars in the light and medium priced field, but the big market will be for cycle cars which American manufacturers cannot reach. The average British car owner might prefer a more powerful car, he said, but he will not pay the extra taxes involved.

Important strides are being made in England in the use of trucks and buses for freight and passenger transportation in intercity work, so much so, said Mr. Stahl, that he doubted that there would ever be any further railroad development in the British Isles. Steam trucks continue to do much of the extreme heavy hauling and the indications are that their use will grow rather than diminish, he said.

Prohibitive tariffs are keeping American car importations to France and Italy to low number, but elsewhere on the Continent there is a good volume of business being done, especially in the Scandinavian countries, Belgium, Holland and Spain. Germany and Russia are not in the market. Regarding the Russian situation, Mr. Stahl regarded the present non-productive condition of that country as favorable for the United States in that it maintained markets for American food-stuffs which otherwise would be non-profitable.

There is a general lack of enterprise among natives of most European countries which precludes the large sale of automobiles at least for many years, said Mr. Stahl. With the exception of Russia none of the countries have natural wealth at all comparable with the United States, and there is a lack of desire to produce wealth by industry due in large measure to the socialistic and communistic doctrines everywhere preached.

Ford Now Getting Ready to Make Heavier Truck

DETROIT, Oct. 8—Presentation of the heavier Ford truck, which has been a subject of discussion in the industry for the last few years, is expected to take place about the first of the year. It is understood that the company completed its experimental and test work and is now getting ready to start production.

The truck will be of 2½-ton capacity, powered by a new engine which the company has developed, and which, though somewhat similar to to the engine of the Fordson tractor, is still a distinct type. The presentation of the truck has not progressed to the point where any indication of the price can be ascertained.

DROPS READING MOTORCYCLE

CLEVELAND, Oct. 7—The Reading Standard Motorcycle, which has been manufactured by the Cleveland Motorcycle Manufacturing Co. for several years, has been discontinued, the company now concentrating on the manufacture of Cleveland motorcycles and bicycles.

2 Makers Consider Joining Interests

Moon and Gardner Have Held Several Conferences That Look to This End

ST. LOUIS, Oct. 8—Preliminary steps that may lead to a merger of the Moon Motor Car Co. and the Gardner Motor Co., both of this city, have been taken this week. Two conferences, participated in by representatives of both concerns, have been held with this end in view, but as yet the negotiations have not reached a stage which will permit of any announcement being made. Neither side will discuss the matter, although it is admitted that the deal is being considered.

Both companies concerned in the negotiations long have been prominent in the industry, meeting with success in marketing popular priced cars. The Moon company is one of the oldtime makers, having been organized in 1907 as the Moon Motor Car Co. under the Missouri laws. In 1917 it became a Delaware organization and last year turned out approximately 10,000 cars. Stewart McDonald is president of the company, having been identified with it in an executive capacity since its inception.

The Gardner company is credited with the production of 8000 cars last year. It was incorporated under New York laws in 1920 and its control has been vested in the Gardner family, father and sons. This year Russel E. Gardner, Jr., became president, with other members of the family occupying prominent executive offices.

Mason Tire Sales Show Big Gain Since April

CLEVELAND, Oct. 8—Gross sales of the Mason Tire & Rubber Co. have increased from $400,000 in April of this year to $1,014,000 in August, while operating figures were changed from red to black in June, the month following the reorganization of the company.

Changes in executives just announced are expected further to strengthen the organization. C. H. Williams has been made a director and vice-president, in charge of branch sales. J. H. Diehl, vice-president, has been placed in charge of manufacturers' sales under the new arrangement, which was made necessary on account of increased business.

Mr. Williams gained extensive sales experience with the Goodyear Tire & Rubber Co. While with that company he devoted two years to opening branch offices in America and foreign countries, following which he acted as sales specialist. Recently he has been in charge of the Chicago office, which is the largest operating division of the Goodyear company.

Operations at the Bedford plant are at capacity. The Kent tire plant is running 75 per cent of capacity, and the textile mill at Kent is operating at capacity. In May the company owed $1,181,000, which included $475,000 of bank loans. The bank indebtedness has been wiped out, and current liabilities total $670,000. Current assets are $2,300,000, or better than a three-to-one ratio.

Star, Flint and Durant Price Lists Increased

NEW YORK, Oct. 6—A revision of prices on Star, Durant and Flint models is announced by Durant Motors, advances having been made in some instances, while several new models are included in the list.

Increases have been made, ranging from $40 up to $255, the last being on the Flint five-passenger sport phaeton.

The prices are f.o.b. Lansing, the new and old list being as follows:

	Old	New
STAR		
5-pass. phaeton	$540	$540
5-pass. spec. phaeton	640	795
5-pass. sedan	785	820
5-pass. spec. sedan	935	1090
2-pass. coupe	695	750
2-pass. roadster	745	745
Chassis	....	445
6-pass. station wagon	....	635
DURANT		
5-pass. phaeton	890	890
5-pass. spec. phaeton	1090	1140
5-pass. sedan	1365	1365
5-pass. spec. sedan	1465	1550
4-pass. coupe	1340	1340
4-pass. spec. coupe	....	1410
2-pass. business coupe	1035	1035
2-pass. spec. roadster	1040	1080
5-pass. coach	1185	1185
5-pass. spec. coach	....	1250
Chassis	....	780
FLINT		
Model 40		
5-pass. phaeton	1075	1075
5-pass. brougham	....	1630
Model 55		
5-pass. phaeton	1495	1495
5-pass. sedan	2185	2185
5-pass. brougham	2735	2735
4-pass. coupe	2095	2095
2-pass. roadster	1630	1630
5-pass. sport phaeton	1795	2050

Winter Inclosed Models Now Part of Flint Line

DETROIT, Oct. 6—Flint Motor Co. had added two winter inclosed models to its regular line, both five-passenger vehicles, the Flint 40 being priced at $1,151, and the Flint 55 at $1,675, both factory list. The cars come equipped with heaters and have standard glass inclosing panels.

HARLEY-DAVIDSON PRICES

MILWAUKEE, Oct. 8—The Harley-Davidson Motorcycle Co. has announced the new reduced prices of its 1925 models of motorcycles. They are as follows:

MODEL		PRICE
25FE,	Magneto equip'd, 61 cu. in. motor	$295
25JE,	Electric equip'd, 61 cu. in. motor	315
25FDCB,	Magneto equip'd, 74 cu. in. motor	315
25JDCB,	Electric equip'd, 74 cu. in. motor	335

Haynes' Plan Meets Creditors' Approval

Almost Unanimous Assent Given —Court Is Expected to Sanction Action

KOKOMO, IND., Oct. 8—Creditors of the Haynes Automobile Co. were almost unanimous in acceptance of the composition offer by which they will receive 15 cents on the dollar at a hearing held here yesterday before Harry C. Sheridan, referee in bankruptcy.

Approximately 300 creditors were present and of this number 258 voted for acceptance, 20 opposed acceptance and the remainder did not vote. The next step, according to Earl Barnes, attorney for the Haynes company, will be submission of the creditors' decision to Judge A. B. Anderson of the Federal Court at Indianapolis for confirmation.

Mr. Barnes stated that Judge Anderson will give 10 days' notice to creditors of a session of court at which he will announce his ruling. The referee at this time also will submit his findings on the evidence heard yesterday at Kokomo. As the referee has expressed himself as favorable to the composition, it is believed Judge Anderson will grant his official approval.

Officials of the Haynes company are more optimistic now than for the past year during which the company has been in financial trouble. They believe that it will be only a matter of time before the factory reopens.

The composition proposal resulted from an offer by interests controlling the Apperson Automobile Co., also of Kokomo, by which they would lease the Haynes plant for five years, with the privilege of another five and pay unsecured creditors on a 15 per cent basis. Settlement of the question on this basis would mean, of course, the nullification of further bankruptcy proceedings.

Best Month Since April for Olds Motor Works

LANSING, MICH., Oct. 6—Sales by Olds Motor Works in the twelve months' period in which its present model has been in production approximate 48,000 cars, according to company statement. In September sales approximated 4500, this representing about the number of retail sales. This was the best month since April and will be exceeded by October, according to orders now on hand, the factory declares.

Demand for its new coach and for the other inclosed models of its line has been so heavy, the factory declares, that it confined all operations during a one week period to closed models exclusively, this being the first time that open car manufacture has been completely suspended in the 27 years of its existence. Demand for the coach has been greater than anticipated, says the company.

MEN OF THE INDUSTRY

Harry S. Daniels Opens Office

Harry S. Daniels has retired as publicity manager of the Buick Motor Co., to open an office in Detroit as an advertising representative. Before joining the Buick company, Mr. Daniels was advertising manager of the Dort Motor Car Co. and previous to that was advertising manager of the Kissel company.

Glancy Manages Oakland Production

A. R. Glancy has been appointed vice-president in charge of production and assistant manager of the Oakland Motor Car Co. At one time Mr. Glancy was president and general manager of the Waukesha Malleable Iron Co., Waukesha, Wis., a property that was discontinued by General Motors some time ago. He has been identified with General Motors interests for the last five years and previously was connected with the duPont organization for five years.

W. H. Bell Resigns

W. H. Bell, assistant general sales manager of the Kelly-Springfield Tire Co., has resigned. As yet he has not announced any definite plans, but will remain in New York for the time being, with headquarters at the Lotos Club. Mr. Bell had been with the Kelly-Springfield company for many years, first as branch manager and later as a member of the general sales department.

Pfeiffer with Consulting Engineer

Rudolf S. Pfeiffer, designing engineer for the Holt Manufacturing Co., has severed his connection with that concern to become associated with Benjamin S. Pfeiffer, consulting engineer, of Chicago. He will specialize on engine design and general automotive work.

Frank G. Eastman Makes Change

Frank G. Eastman has resigned as a member of the sales section of the advertising staff of the General Motors Corp. to become a member of the Glen Buck Co. organization in Chicago. Mr. Eastman is well known in the industry as a former advertising manager of the Packard Motor Car Co., with which he was identified for eight years, and as advertising manager of the Lincoln Motor Car Co., as organized by Henry M. Leland.

Pfeifer Is Brude Sales Manager

C. R. Pfeifer has been appointed sales manager of the T. M. Brude Co. of Chicago, maker of the Brude visor. Mr. Pfeifer until recently was sales manager of the Hill Pump Valve Co., manufacturing the Utility heater.

FORD PLANT IN NORFOLK

NORFOLK, VA., Oct. 8—William Wallace, for the last four years assistant manager of the Philadelphia plant of the Ford Motor Co., has set up the Norfolk headquarters of the company and is building up the organization for the operation of the new assembly plant here about Jan. 1.

The plant will employ about 1500 men at the start and will have a capacity of about 300 cars a day. Output will be distributed through Virginia and the Carolinas.

McCord to Celebrate Its 25th Anniversary

DETROIT, Oct. 8—The silver jubilee of the McCord Radiator & Manufacturing Co., maker of copper asbestos gaskets, cork gaskets, radiators for Fords and service cores, will be celebrated the week of Nov. 3. This will take the form of the company's annual sales convention, which will bring the field men and district managers together to discuss plans and policies.

Following four days of meetings, those in attendance will be banqueted at the Detroit Yacht Club, Thursday evening. All day Friday and Saturday morning they will inspect the Detroit and Wyandotte plants, and Saturday afternoon attend the Michigan-Northwestern football game at Ann Arbor.

Space at Salon Taken by Foreign Exhibitors

NEW YORK, Oct. 8 — The twentieth annual Automobile Salon, which will be held at the Commodore Hotel in this city Nov. 9-15 will have a distinct foreign flavor, with Excelsior, Isotta Fraschini, Lancia, Maybach, Mercedes, Renault, Rolls-Royce and Voisin booked for the exhibition. In addition the Cunningham and Duesenberg will be displayed by their makers.

Coach makers will show the Cadillac, Lincoln, Locomobile, Mercer, Packard, Peerless, Pierce-Arrow and Wills Sainte Claire. The custom body builders listed include Blue Ribbon, Brunn, Derham, Dietrich, Fisher, Fleetwood, Holbrook, Judkins, Le Baron, Locke, Merrimac, Springfield and Willoughby.

Maxwell, Hupp and Hudson Report on Production

DETROIT, Oct. 7—Reports received announce September shipments of Chrysler and Maxwell cars to be 7521 compared with 6258 for September, 1923, of which 4202 were Maxwells and 3319 Chryslers. Production for the two totaled 7553, the budget being 7255.

Hupp Motor Car Co. produced 3034 cars in September, against 2721 in August and 3529 in September a year ago, with profits approximating $200,000. It is expected October production will be about the same.

Hudson Motor Car Co.'s production figures for September are given as 10,500 Hudson and Essex cars, against 14,025 in August and 5800 in September, 1923.

Balloons May Change Spring Dating Plan

Dealers Feel That Action Should Be Taken Because of Great Number of Sizes

NEW YORK, Oct 8—Spring dating will be one of the important problems to be considered at the annual convention of the National Tire Dealers Association at Akron Nov. 18-20, because of the complications brought about by the adoption of the balloon tire.

Attention to this subject is called by President George J. Burger, who declares that the manufacturers should cooperate with the dealers and avoid overloading the latter in the campaign for spring business which is just about to start. He says that the problem should not be left to the dealer to solve alone.

Balloons, Mr. Burger holds, have complicated the workings of the spring dating plan because of there being 23 or more standard sizes of balloon casings, besides the regular run of high pressure tires. To him it would seem a big burden to ask dealers to overstock in the numerous sizes, and he thinks manufacturers should carefully analyze the situation at the present time. Next year, he says, when balloons become regular equipment on most of the cars, the situation will be more stabilized.

As yet this matter has not been brought to the attention of the Rubber Association of America, but it is said that individual manufacturers undoubtedly have realized the complications caused by the multiplicity of balloon sizes in arranging their winter's selling campaign.

Uruguay Will Not License Cars with Left Hand Drive

WASHINGTON, Oct. 8—Without assigning any reason for its action, the Departmental Council of Montevideo, Uruguay, which is the law-making body of that country, has passed a law that on and after March 4, 1925, no automobile with a left-hand drive will be licensed.

The law was passed on Sept. 4 and first made effective Jan. 1, next. On Oct. 2 the effective date of the order was changed to March 4. Passage of the law will not only prevent the importation of left-hand driven automobiles into that country, but the law, as written, specifies that left-hand driven automobiles will not be licensed, and would affect all the cars already in operation.

The new ruling further stipulated that entrance to the front seat must be on the left-hand side, but permits of a right-hand entrance, if an additional one is desired.

The Ford agency in that country has announced that it is working to have the law changed.

M.A.M.A. Convention Program Completed

Sessions Will Open at Cleveland on October 15 and Continue for Three Days

NEW YORK, Oct. 6—Nothing has has been left undone by the Motor and Accessory Manufacturers Association to make its annual convention, Wednesday, Thursday, Friday and Saturday of next week at Cleveland, its usual success.

E. P. Chalfant, chairman of the program committee, has prepared a most attractive list of speakers, who will follow closely the chosen theme, "Getting Ready for Better Business," while C. E. Thompson, chairman of the Cleveland committee of arrangements, is ready to care for his guests.

Sessions will be devoted to the business outlook, to improved merchandising methods, to foreign trade and to the handling of credits. The program follows:

WEDNESDAY, OCT. 15

Morning

Registration, Hollenden Hotel.

Afternoon

Chairman, G. Brewer Griffin, president M. A.M.A. and manager, Automotive Division, Westinghouse Electric & Manufacturing Co.

Address of Welcome—William R. Hopkins, Cleveland city manager.

General Manager's Report—M. L. Heminway, general manager, M. A. M. A.

"The Outlook for Better Business"—

"The Case for Business," Richard F. Grant, president, Chamber of Commerce of the United States.

Automotive Outlook," Alfred Reeves, general manager N. A. C. C.; W. O. Rutherford, president Rubber Association of America; Mr. Griffin.

Evening

Banquet, Hollenden Hotel.

THURSDAY, OCT. 16

Morning

Chairman, E. P. Chalfant, chairman of the board, Gill Manufacturing Co.

"Better Merchandising as the Foundation of Better Business"—

"The Jobbers Place in the Automotive Selling System," J. H. Mehan, manager, Research Club.

"Selling Through the Specialty Distributor," J. H. Shoemaker, distribution manager Perfection Heater & Manufacturing Co.

Afternoon

"Getting and Holding the Interest of the Jobber Salesman," L. A. Safford, vice-president McQuay-Norris Manufacturing Co.

"Making the Jobber or Distributor Part of the Manufacturers' Advertising Program," C. A. Musselman, president the Class Journal Co. and the Chilton Co.

"The M. A. M. A. Show Program as a Merchandising Medium," Neal G. Adair, manager show department, M. A. M. A.

Evening

Chairman, Guy A. Wainwright, vice-president Diamond Chain & Manufacturing Co.

"The Foreign Trade Opportunity—How to Take Advantage of It"—

"The Foreign Trade Outlook," speaker not announced.

"Selling the Foreign Trade"—

(a) "Through an Export Department," J. F. Kelly, export manager, Electric Storage Battery Co.

(b) "Through a Combination Export Manager," H. I. Kraus, export sales agent.

FRIDAY, OCT. 17

Morning

Chairman, M. A. Moynihan, secretary and treasurer Gemmer Manufacturing Co.

"Better Credit Work as an Aid to Better Business"—

Facing the Facts," Ludwig Kemper, treasurer Midland Steel Products Co.

"Handling Foreign Credits," J. L. Thompson, credit manager, Yale & Towne Manufacturing Co.

Afternoon

Chairman, R. S. Harvey, vice-president Rees Manufacturing Co.

"Jobbers' and Distributors' Credits," J. K. Williss, credit manager, Black & Decker Manufacturing Co.

SATURDAY, OCT. 18

Golf tournament.

Following each of the papers at the business sessions, time will be allowed for discussions.

Wohlrab Makes New Type Steering Gear Assembly

RACINE, WIS., Oct. 6—The Wohlrab Gear Co. of Racine, Wis., has just placed on the market a steering gear assembly for motor vehicles of a new type designed to obviate accidents resulting from the too speedy action of the wheel. It is of half-nut and screw construction and is entirely adjustable from the outside.

The design was patented more than a year ago and the idea was based on the newer needs brought about by the adoption of balloon tires. Road shocks are not transferred to the wheel and the car is held steady under all road conditions. The Wohlrab company is manufacturing the new design both for original and replacement equipment, the installation being simple and requiring no changes of consequence for adapting to present cars.

Boyce-ite Being Sold Direct to Consumers

NEW YORK, Oct. 6—Boyce-ite treated gasoline now is being sold direct to the consumer in 60 of the larger cities, through an arrangement made by Boyce & Veeder Co., Inc., manufacturer of Boyce-ite, with leading distributors of gasoline in these centers.

In order to assure the buyer of the identity of the fuel, the gasoline is colored blue-green. This step has been taken to save the consumer the trouble of mixing Boyce-ite and gasoline—the service station does it for him.

FORDOR SEDAN UPHOLSTERY

DETROIT, Oct. 3—The Ford Fordor sedan is now being upholstered in a slate-blue fabric with royal blue striping. The dark brown cloth previously used in this and other Ford closed models is continued in the Tudor and coupe models. Head linings and carpets in the Fordor harmonize with the new upholstery. Blue silk curtains are provided on the back and rear quarter windows.

Plans Taking Shape for S. A. E. Meeting

Program Partially Ready, with Many Speakers and Subjects Announced

NEW YORK, Oct. 6—The program for the production meeting of the Society of Automotive Engineers, to be held in Detroit Oct. 22-24 inclusive, is rapidly being whipped into shape and it is expected that it will be complete by the end of the week.

About 20 papers on factory methods will be presented and production engineering in all its phases will be discussed. As it stands at the present time, the program follows:

WEDNESDAY, OCT. 22

Morning

Registration.

"Reducing Manufacturing Costs," A. L. DeLeeuw, consulting engineer.

"Coining-Press Operations on Automobile Parts," A. R. Kelso, Hudson Motor Car Co.

Afternoon

"Experience with the Group-Bonus Plan," H. G. Perkins, Maxwell Motor Corp.

"Reducing Labor Turnover," C. A. Lippincott, Studebaker Corp.

"Methods of Shipping Motor Cars," Ben Moore, Dodge Brothers; Frank Henry, Studebaker Corp.

Evening

"Automobile Glass Manufacture, Inspection, Defects and Salvage," John H. Fox, Pittsburgh Glass Co.

THURSDAY, OCT. 23

Morning

"Utilization and Prevention of Waste," Carl B. Auel, Westinghouse Electric & Manufacturing Co.

"Salvage of Tools," L. A. Churgay, Maxwell Motor Corp.

"Reducing Wood Waste in Body Manufacture," B. Naaglevoort, Towson Body Co.

"Combatting the Checking of Wood in Drying Ovens," H. D. Tiemann, Forest Products Laboratory.

Afternoon

"Some Notes on Tool Design," Joseph Lannen, Paige-Detroit Motor Car Co.

"Avoiding Mistakes in Tool Design," Paul V. Miller, Taft-Peirce Manufacturing Co.

"Improvements in Nickel Plating," W. H. Graves, Packard Motor Car Co.

"Durability of Plated Surfaces," W. M. Phillips, General Motors Corp.

Evening

Dinner at Hotel Statler

FRIDAY, OCT. 24

Morning

"Supervision of Factory Maintenance; Reducing Its Cost," E. E. Remington, Ford Motor Co.; L. A. Blackburn, Olds Motor Works; Fred Sharp, Oakland Motor Car Co.

Afternoon

Visiting factories, optional visits to Ford Motor Co.'s Highland Park plant, Continental Motors Corp., Hudson Motor Car Co., and possibly others.

REO IMPROVEMENT IN EAST

DETROIT, Oct. 8—Eastern business of Reo Motor Car Co. is showing increases, according to R. C. Rueschaw, sales manager, who has returned from a conference with a number of Reo distributors along the Atlantic Coast.

Henry Shows Value of Truck Division

A. A. A. President Enlists Makers' Aid in Helping the Recruiting of Members

NEW YORK, Oct. 6—Having been promised the cooperation of the National Automobile Chamber of Commerce in forming a commercial car division of the American Automobile Association, President Thomas P. Henry appeared before the motor truck members of the chamber at their meeting at headquarters last week and told them of the plans for inaugurating the division.

Mr. Henry asked the makers to cooperate with the A. A. A. by having their dealers and branch managers tell their customers of the advantages to be derived from membership in the new division, so that when representatives of the organization start recruiting membership they will find truck and bus owners in a receptive mood.

Will Compile Operation Costs

He pointed out that truck operators and passenger car owners have much in common and by uniting can bring about much needed legislation. He also emphasized the intention of the division to compile operation and maintenance costs on national as well as sectional basis, something that has not been attempted before.

Some of the advantages to be derived from a truck division as pointed out by Mr. Henry are:

1. Greater use of trucks, due to increased knowledge of their efficiency, availability and low cost in comparison with other types of transportation.
2. Extension and widening of roads due to facts gathered and presented as to increased tonnage carried over highways.
3. Extension of snow removal work by authorities on roads carrying a large amount of tonnage.
4. The further development of regular bus and truck routes with an increased knowledge upon the public's part of their extension and usefulness.
5. Propaganda developed for making great direct arterial highways for the rapid transfer of freight, and for the extension of such highways, overhead or underground.

The meeting also considered the advisability of holding regional motor transport conferences, and a provisional program was drawn up for one to be held in Boston in December, which will be presented to the Chamber directors for their approval in November.

Discuss Ohio Tax

T. R. Dahl of the White Co., talking on "What Shall Be Done About the Present Ohio Truck Tax?", gave a history of the recent legislation enacted in Ohio, which was said to be unjust and discriminatory. The truck makers were invited to send representatives to a meeting to be held soon in Columbus, when plans for a legislative campaign next year will be made.

WILL TALK EXPORTS WITH PARTS MAKERS

WASHINGTON, Oct. 8 — The problems of parts and accessory manufacturers in doing an export business are being studied first hand by W. H. Davidson, chief of the Parts and Accessories Section of the Automotive Division, Department of Commerce.

Manufacturers in Philadelphia have been invited to confer with him on Oct. 13, when he will visit their city. On Oct. 14 he will confer with manufacturers in Cincinnati; on the 15th in Indianapolis, on the 16th in Chicago and on Oct. 17-18 in Cleveland. At the latter place he will attend the convention of the Motor and Accessory Manufacturers Association.

The question of bus standardization, with the New Jersey situation in mind, also came up. It was brought out that the Public Utilities Commission of New Jersey is working on a plan to develop a set of bus standards for that State and has been endeavoring to obtain the opinion of motor bus makers through the S. A. E. on the proposed regulation.

The meeting felt, however, that, while it is desirable to set up definite bus standards as early as possible, the time has not yet come when it is feasible to do so. The bus members felt that the bus is in a comparatively embryonic stage of development now, and that it will develop much more rapidly if standards are not imposed now. Any standards adopted by New Jersey at the present time might be copied by other States and result in harmful legislation.

Macauley Is Chairman of Service Committee

NEW YORK, Oct. 7—Alvan Macauley, president of the Packard Motor Car Co., has accepted appointment as chairman of the Service Committee of the National Automobile Chamber of Commerce. He will at once assume active direction of the promotion of the service convention which will be held in Cleveland, Nov. 18-19, under the joint auspices of the S. A. E. and the Chamber's factory service managers.

While the Cleveland convention program has not been completed, H. R. Cobleigh, secretary of the Service Committee, is mapping out a card which will include the major topics of the day from the viewpoint of the service managers, such as treated fuel, four-wheel brakes, balloon tires and newer forms of body paints.

Other subjects that will have consideration include training of field mechanics, possibilities for greater standardization in electrical equipment, special tools and service equipment for the field and the use of dust catchers to reduce cylinder wear.

Strong Effort Urged to Develop Exports

Alfred Reeves Suggests That Makers Should Begin to Think of Smaller Car

NEW YORK, Oct. 3—That American manufacturers should institute more aggressive sales campaigns in Europe and that they should begin to think more about smaller cars was the suggestion made here today by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, speaking before a special meeting of export managers of the Chamber.

In telling of his recent trip to a number of European countries, he said also that more automotive executives, empowered with authority to act, should visit Europe to the end that sounder relations might be attained with distributors abroad.

Real Campaign Suggested

"I would like to see a real campaign behind the American car in Europe," he said. "It should have been started much earlier but, with conditions improving, enlarged sales are to be anticipated."

Dealers are not visited sufficiently often by factory executives, he declared, and added that most manufacturers had not given sufficient attention to the competition offered to their lines in Europe. He hoped that there would be a development of free ports in Europe, in which cars might be kept on the maker's account for quick delivery. The general impression received from his talk was that European sales should become of increasing importance, if strong effort were made to develop the possibilities.

Of particular interest to the export managers themselves was the decision taken that the Bureau of Foreign and Domestic Commerce should tabulate statistics of export shipments on passenger cars to include listings by value of $800 to $1,200 and $1,200 to $2,000, thus breaking up the present listing of $800 to $2,000 into two classifications, effective in 1925. This decision followed a talk by H. H. Kelly, acting chief of the Automotive Division. A change regarding trucks, to clarify the listing of "commercial vehicles," was decided upon and in turn the meeting voted in favor of having standard export declarations printed.

Bauer Tells of Mexico

George F. Bauer, secretary of the foreign trade committee of the Chamber, told of his recent trip of investigation to Mexico, saying that the use of passenger cars was expanding in that market and that the country was now undergoing the first stage in its truck development. He said that negotiations had been started to lower the minimum car load shipment of automobiles on the Mexican railroads,

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Latest Bus Models Seen at Rail Show

Fifteen Manufacturers Display Vehicles—Automotive Executives Attend

ATLANTIC CITY, Oct. 8—Six-wheel buses, more extensive use of six-cylinder engines and air-operated brakes, and the introduction of better appearing and more comfortable bodies are among the important features of the automotive exhibits held in connection with the American Electric Railways Association here.

Balloon tires have made their first appearance in the bus field, while four-wheel brakes, some mechanically, some air and others hydraulically operated, are becoming almost as common as on passenger cars. Air chambers are used extensively.

Some 15 bus manufacturers have exhibits of complete vehicles, while numerous body and parts makers are showing their wares. The attendance at the show is excellent and includes many automotive executives and engineers, besides those having their own exhibits. Nearly half the show space is used by concerns which manufacture some automotive equipment.

Exhibitors of New Chassis

Among exhibitors who have one or more entirely new chassis, shown for the first time, are Mack, Yellow, Uppercu, Garford and Six-Wheel.

Mack's new showing is a six-wheel chassis of mammoth proportions, fitted with a new 100-hp. six-cylinder engine and intended for high speed interurban service. The wheelbase is 266 in. All six wheels have brakes, the rear being the Servo type, foot operated, and the front and propeller shaft brakes are hand operated. The front wheels have live spindles and two propeller shafts drive two rear axles. The chassis weighs 11,000 lb. and will carry a de luxe body seating 33 passengers.

The new Yellow Coach chassis both have six-cylinder sleeve valve engines and frames reinforced with tubular members. All Yellow chassis have balloon tire equipment, including the double deck city type.

Bodies Have Wicker Seats

Many bodies are fitted with wicker seats, often with double spring cushions. Bodies in general are more attractive and many have lines very similar to the latest passenger cars. Some are painted with pyroxylin lacquers and leather interior trim is popular.

Yellow coaches have a new air brake system of the company's own make, operated by pistons in wheel brakes.

Timken Axle is showing a new brake with air-operated diaphragm actuating a piston of the hydraulic system which applies Lockheed brakes.

Metal sash is widely used in body construction, while plywood also is employed extensively. Bodies are constructed entirely of steel but a majority still use much wood.

Engineers are greatly interested in the Uppercu Coach chassis which incorporates many novel features including a detachable front wheel drive tractor, a perfectly straight 9-in. channel frame, the top of which is only 18 in. from the ground, and an entirely new form of structure between wheels and frame.

This chassis has no axles. Front wheels are carried on a single heavy transverse spring and a pair of radius members parallel thereto. Rear wheels are mounted at the end of heavy radius arms and are supported by springs, the ends of which bear on rubber blocks. The steering and braking system also are unusual. The latter is of the vacuum operated variety and acts on rear wheels direct and on front wheels through propeller shaft drum and differential.

FINANCIAL NOTES

Indian Motorcycle Co., formerly the Hendee Manufacturing Co., reports a net income of $88,102 for the year ended Aug. 31, after expenses, depreciation, etc., equivalent after preferred dividends to 18 cents a share earned on the outstanding 100,000 no par common shares. This compares with $207,737, or $1.37 a share earned on 100,000 shares of $100 par in the preceding year.

Firestone Tire & Rubber Co. has declared the regular quarterly dividends of $1 a share on the common, payable Oct. 20 to holders of record Oct. 10, and 1½ per cent on the 6 per cent preferred, payable Oct. 15 to stock of record Oct. 1.

Doehler Die Casting Co. has declared the regularly quarterly dividend of 50 cents a share on the common stock, payable Nov. 1 to stock of record Oct. 15.

United States Rubber Co. has declared the regular quarterly dividend of 2 per cent on the preferred, payable Oct. 31 to stock of record Oct. 15.

Reynolds Spring Co. has declared its regular quarterly dividend of 25 cents on common, payable Nov. 1 to stock of record Oct. 15.

Rickenbacker Motor Co. has declared its regular quarterly dividend of 2 per cent, payable Oct. 15 to stock of record Sept. 30.

Fisher Body Corp. has declared its regular quarterly dividend of $2.50 on common stock, payable Nov. 1 to stock of record Oct. 20.

Moon Motor Car Co. has declared the regular quarterly dividend of 75 cents a share, payable Nov. 1 to stock of record Oct. 15.

Mullins Body Corp. has declared its regular quarterly dividend of $2 on the preferred, payable Nov. 1 to stock of record Oct. 15.

Hupp Motor Car Co. has declared its regular quarterly dividend of 25 cents, payable Nov. 1 to stock of record Oct. 15.

Ford Motor Co. of Canada has declared a 10 per cent dividend payable Nov. 15 to stock of record Nov. 5.

Sterling Motor Truck Co. has paid its twenty-fifth quarterly dividend of 2 per cent.

Graham's New Truck Has Five Body Types

Is of 1-Ton Capacity—Company Is Also in Production on a Bus Chassis

DETROIT, Oct. 8—Graham Brothers is now in production on a new 130 in. 1-ton capacity truck in five body types and also on a bus chassis in 158 and 140 in. wheelbase lengths which is furnished with sedan or street car type bodies.

Prices on the line follow: 1-ton chassis, $1,175; express, $1,345; canopy top, $1,380; stake, $1,385; screen side, $1,415; panel, $1,445. These prices are with open cab, an additional charge of $30 being made for the closed type. The 140 in. bus chassis is $1,550; 13-passenger sedan body, $3,340; 17-passenger street car type, $3,390. The 158 in. bus chassis is $1,640; 17-passenger sedan, $3,640; 20-passenger street car type, $3,290. The 1½-ton truck chassis, 140 in. wheelbase, is $1,375 and $1,425 for 158 in. wheelbase.

The general specifications of the new truck and bus chassis are similar to those of the 1½-ton model. All models now have internal service and emergency brakes acting on 16 in. drums on the rear wheels. This is a change on the 1½-ton model, which formerly had external and internal brakes. The brake linkages operating the two sets of brakes are arranged so that either set may be used for service and the other for emergency, and vice versa.

Other Specifications

The front springs on all models are 37 x 2 in. On the 1-ton job the rear springs are 46¾ x 3 in. and on the bus chassis 56 x 3 in. The springing on the 1½-ton model has been made the same as on the bus chassis, the length of the rear spring having been increased from 46 in. Helical bevel rear axles are used on both the 1-ton truck and bus chassis, the reduction being 5.1 in the former case and 6.3 in the latter.

On the new truck wood wheels, demountable rims and 33 x 5 in. pneumatic tires are regular equipment. The bus is equipped with 32 x 6 in. pneumatics, demountable rims and steel spoke wheels. An option of 30 x 5 in. front and 32 x 6 in. rear pneumatic tires is now offered on the 1½-ton model. Bodies furnished on the 1-ton chassis have a wood framework with steel panels finished in gray Duco.

Sterling-Knight to Make Coupe Priced at $3,200

CLEVELAND, Oct. 6—Sterling-Knight Co., with plant at Warren, Ohio, has announced the addition of a new model to its line of 1925 cars. The job is to be a four-passenger offset coupé to list at $3,200. It will have a Phillips custom built body. Deliveries will start in December.

South Africa Busy Selling Old Stocks

Details of New Models Kept from Public Pending Clearance of 1924 Cars

JOHANNESBURG, SOUTH AFRICA, Sept. 9 (*by mail*)—The motor industry is doing remarkably well, despite the somewhat acute unemployment problem and the set back experienced by the farmers, and while there has been a decrease in sales, the position is not serious. All dealers, of course, have stocks on hand and are anxious to dispose of them before the public begins to talk of the 1925 models.

Whispers of the new models are to be heard, but the man in the street knows very little about them, and it is thought there will not be much difficulty in getting rid of the 1924 stocks on hand. Dealers, naturally, are very anvious that details of the new models should not be broadcast to the public before the old stocks have been disposed of and the automobile press throughout the country has been asked not to divulge more than is absolutely necessary.

The sale of motor bus equipment has not decreased, and numerous routes in the larger towns have been opened lately. The motor bus is well established and it is thought that many more vehicles will be in service within the next few months. The great majority of the motor buses in service have been built locally on Reo speed wagons, although, of course, other makes also figure. American trucks have scored in this direction and very few English buses are now being imported.

Organizing for the Christmas trade has not yet started although it is anticipated that this year there will see quite a good turnover of accessories. Last Christmas only one firm, William, Hunt & Co., Chevrolet distributor, really went out to tell the public that automobile accessories make excellent and acceptable gifts.

Strong Effort Urged to Develop Exports

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from 10,000 kils (about 22,000 lb.) to approximately 10,000 lb.

Dealer establishments are well equipped for sales and service and real promotional work is being done by numerous distributing companies. He explained that a number of highways were being constructed and declared that the greatest need of the Mexican dealers and distributors was for retail financing facilities.

The exporters discussed a number of topics, including the fitting of balloon tires on cars exported, the possibility of shipping their products abroad uncrated and the sale of cars less certain equipment to Australia. Balloon tires are now being shipped on many lines and the tire companies must keep pace with the demand thus created for replacements.

Generally, good sales were reported by the export managers of the various companies, particularly to Australia and Argentina, both of these territories having excellent prospects. The basic products of both these territories were stated to be commanding good prices and it was stated that automobile shipments were going forward in large or record quantities.

INDUSTRIAL NOTES

Sieverkropp Engine Co. of Racine, Wis., has been acquired by the B. & B. Manufacturing Co., of the same city, and the operations have been consolidated at the Sieverkropp works. The B. & B. company manufactures tools, dies, jigs, fixtures, etc., and now is engaging in the general production of special machinery, mechanical appliances, etc. Henry R. Sieverkropp remains with the enterprise and will continue to build gas engines and furnish repair and replacement service. The principal owners of the business are C. S. Bonin and Ernest Bruce.

Hawkeye-Dart Truck Co., Waterloo, Iowa, has incorporated with an authorized capital stock of $200,000, a quarter of which may be issued in preferred stock and the balance in common stock. The purpose is to make automobiles, trucks and power propelled vehicles generally, gasoline pumps, tanks, and air-pressure and heating systems. Officers are: President, A. H. Caward; vice-president, W. B. Caward; secretary, H. C. Wurster, and treasurer, H. S. Caward. The board of directors are the officers and Willis H. Johnson.

Hart-Parr Co., Charles City, Iowa, has leased the Spartan Manufacturing Co. manufacturing rights to the Corn Belt feed mill which the Spartan company operated at Pontiac, Ill., for many years. Stock and equipment are to be transferred to Charles City, where manufacture will continue on a royalty basis. F. M. Lyon was president and general manager of the Spartan company, and will be associated now with the Hart-Parr interests.

G. & O. Manufacturing Co., maker of radiators for cars, trucks, tractors and airplanes, has removed to a new and larger plant in New Haven, Conn. Its executive staff has been enlarged and the number of operatives increased.

United Effort Urged to Curtail Accidents

NEW YORK, Oct. 6—George M. Graham, chairman of the Traffic and Safety Planning Committee of the National Automobile Chamber of Commerce, believes that the number of motor fatalities in the final quarter of 1924 can be materially lessened from that of the preceding quarter if there is a united effort with this object in view. A 90-day cleanup is urged by him in the committee's report on August accidents.

As reported to the committee by the 257 cooperating daily newspapers, there were 634 motor fatalities in August, which leads to the estimate of 1500 fatalities for the entire country, an increase of about 100 over July.

METAL MARKETS

The steel market is making slow progress in groping its way out of the blind alley into which the change from "Pittsburgh plus" base prices has led. With the addition of Newburgh, near Cleveland, where one of the American Steel and Wire Co.'s works is located, as a basing point, the new method of steel price quotations bids fair to become a real stumbling block to a speedy survey of market conditions. The Pittsburgh base of 2.70 cents for cold-finished steel bars implies delivery in the Pittsburgh district. The Newburgh base, also 2.70 cents, is f.o.b. mill, so that the delivered price in Cleveland entails the addition of 6 cents freight per 100 pounds.

This means in effect that Pittsburgh finishers of cold steel bars who want to meet the Newburgh base price in the Cleveland district and sell at 2.76 cents, would realize 2.57 cents, the freight from Pittsburgh to Cleveland being 19 cents. Sheet demand is running considerably ahead of that for other forms of fabricated steel. Sheet mills operate at somewhat better than two-thirds of total capacity, while the entire industry is probably employing slightly less than two-thirds of total capacity, while the entire industry is probably employing slightly less than three-fifths of its capacity.

Non-integrated rollers of full-finished automobile sheets are being offered sheet bars at lower prices. Sales are reported to have been made in the Pittsburgh district at as low as $35, but nominally producers ask $36 to $37. Automotive steel purchases are strictly in response to the immediate requirements of manufacturing schedules. It is interesting to note that the growing use of nickel steel is reflected in the first advance in a long time in the price of nickel, the leading producer of which non-ferrous metal announced a few days ago the new price of electrolytic nickel as 33 cents compared with the previously prevailing price of 31 cents. Ingots were advanced 1½ cents to 29 cents. Alloy steel makers, while having nothing to brag of in the way of business as a whole, enjoy a fairly steady volume of orders from automotive consumers.

Pig Iron.—Although dullness characterizes the pig iron market, there is a fair single car demand for foundry iron. Automotive foundries are accepting deliveries on old contracts, and the impression prevails that much more iron is being melted than bought.

Aluminum.—The aluminum market rules quiet and for want of a subject bearing more directly on the price situation, the trade continues to show much interest in the controversy that rages in the political arena over this metal. Announcement that the American producer was preparing detailed statistical data to controvert the statement that the tariff had added to the aluminum consumer's bill, has enhanced this interest. As a strange feature of the discussion is pointed out the silence with which the fact has been passed over that the American producer is also a very large, if not the largest importer of aluminum from Norway.

Copper.—Following a bad spell, the copper market seems once more to be mending slowly, with prices on the uptrend and domestic as well as foreign demand a shade better.

Tin.—While the market has recovered some of its lost ground, it still lacks pep. London interests have protected values to some extent of late by purchases in the New York market.

Lead.—Production and consumption are nicely matched. The market is steady.

Zinc.—This metal shows slightly more firmness, but demand is rather light.

Calendar

SHOWS

Oct. 17-25—London, Annual Passenger Car Show, Olympia.

Oct. 22-31—Paris, motor trucks, stationary engines, garage tools and machine tools, Grand Palais.

Nov. 9-15—New York, Annual Automobile Salon, Commodore Hotel.

Nov. 9-19—Buenos Aires, Annual Automobile Show, Pabellon de las Rosas, under the auspices of the Automovil Club Argentino.

Nov. 10-15 — Chicago, Annual Show and Convention of the Automotive Equipment Association, Coliseum.

Dec. 1-13—Montevideo, Uruguay —Second Annual Motor Show, under the auspices of the Centro Automovilista del Uruguay, held in buildings of the Asociacion Rural del Uruguay.

Dec. 5-14—Berlin Automobile Show.

Jan. 2-10—New York, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Bronx Armory. Open to the public except on Jan. 2 and 3 which are trade days.

Jan. 23-31 — Chicago, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Coliseum and First Regiment Armory. Open to the public except on Jan. 23 and 24 which are trade days.

Jan. 25-31 — Chicago, Annual Automobile Salon.

RACES

Oct. 19—Kansas City.

Nov. 24—Los Angeles.

CONVENTIONS

Oct. 15-17—Cleveland, Fall Convention of the Motor and Accessory Manufacturers Association.

Oct. 16-18—Briarcliff Manor, N. Y., Semi-Annual Meeting of the American Gear Manufacturers Association, Briarcliff Lodge.

Nov. 10-15 — Chicago, Annual Convention and Show of the Automotive Equipment Association, Coliseum.

Nov. 16-22—Chicago, Transportation Show, under the auspices of the Motor Truck Industries, American Exposition Palace.

Nov. 18-19—Joint Service Meeting of the S. A. E. with the N. A. C. C. Cleveland, Hotel Winton.

Nov. 18-20—Akron, Ohio, Annual Convention of the National Tire Dealers Association.

Jan. 5—New York, Convention under the auspices of the National Automobile Dealers Association, Hotel Commodore.

Jan. 5-9—Chicago, Road Show and Convention of the American Road Builders Association.

Jan. 26-29—Chicago, Eighth Annual Convention of the National Automobile Dealers Association, Hotel LaSalle.

S. A. E. MEETINGS

Oct. 22-24—S. A. E. Production Meeting, Detroit.

Nov.—Indiana Section, Talk by H. A. Huebotter of the Engineering Experiment Station of Purdue University.

Dec. 11—Indiana Section, Aviation Development, Major E. L. Hoffman; Superchargers, Dr. F. A. Moss.

Jan. 15—Indiana Section, Lubrication and Crank Case Dilution, W. S. Sparrow of the U. S. Bureau of Standards.

Jan. 20-23 — S. A. E. Annual Meeting, Detroit.

Feb.—Indiana Section, Automobile Finishes.

Mar.—Indiana Section, Developments in Transmission.

Apr. 9—Indiana Section, Talk by F. E. Hunt, vice-president of the General Motors Research Corp.

August Showed Gain in Tax Collections

WASHINGTON, Oct. 8 — Internal revenue collections from automobiles, motorcycles and accessories for August, 1924, amounted to $9,277,185, or an increase of $282,142 over August, 1923, when collections were $8,995,044.

Collections from the automotive industry during August, just past, were approximately 10 per cent of the aggregate collections for the month, which were $88,354,245.

A decided drop is noted in the automotive industry's contributions for the July 1-Aug. 31 period of 1924, as compared with the same period in 1923. The 1924 collections were $20,750,605, or a decrease of $6,370,755 from those of the 1923 period. It is noted, however, that the collections from all sources in August, 1924, is far below the collections in August, 1923, the former being $88,354,245, as compared with $131,467,163.

The segregated taxes collected from the automotive industry for August, 1924, were: Motor trucks and automobile wagons, $701,899; other automobiles and motorcycles, $6,156,299; automobile parts and accessories, $2,418,987; as compared the automotive industry for August, 1924, Motor trucks and automobile wagons, $700,516; other automobiles and motorcycles, $5,134,582; automobile parts and accessories, $3,159,944.

Detroit's New Car Sales Fell During September

DETROIT, Oct. 4—Sales of new cars in Detroit during September totaled 4137, which compares with an August total of 4347, and a September, 1923 total of 5619. The ratio of closed car sales to open was almost two to one, 2673 to 1464 in September, whereas in September, 1923, open car sales slightly outnumbered closed, the total being 2854 to 2765. Truck sales in September showed a gain over August, the figures being 484 to 323. The truck figure was 11 under the September, 1923 total.

Ford car sales during September were 1835 or 44.3 per cent of the month's total, which compares with 48 per cent last year. All low priced lines made up 53.5 per cent of the total, comparing with 63 per cent last year. Cars in the $1,000 price class and under aggregated 70 per cent, comparing with 71 per cent last year. Medium priced cars made up 27 per cent of the total, which compares with 25 per cent last year. High priced cars maintained the same position with 3 per cent of the total.

In the truck columns, Ford sold 332 of the 484 delivered. Other light truck makers featured in the deliveries, the light truck deliveries outnumbering the heavier vehicles by about four to one.

Sub-Committees Report Best Safety Practices

NEW YORK, Oct. 6—The Motor Vehicle Committee of which H. M. Crane, president of the S. A. E. is chairman and which is one of the eight units constituting the Conference on Street and Highway Safety, sponsored by Herbert Hoover, head of the Department of Commerce, met today at the headquarters of the National Automobile Chamber of Commerce.

Eighteen members of the committee attended to hear reports from three sub-committees on standard practice from the safety viewpoint, but definite action on these recommendations was postponed until another meeting which will be held here Oct. 21.

The other seven committees of the conference have completed their work and there will be general action taken at the big meeting to be held in Washington.

Sales Good in Peru During Pre-Holiday

LIMA, PERU, Oct. 8 (*by mail*)—Sales of automobiles, trucks and accompanying articles kept up well during August. Generally sales fall off heavily after the big buying that precedes the National Holidays of July 28-30.

This year, contrary to previous experience and to general expectation, August proved a better month for some dealers than July. This may be accounted for by the fact that July sales, though good, did not show the seasonal increase experienced in past years. Lower prices on certain articles during August may also have tended to augment sales.

Work on road construction in various country districts continues. The road to Ayacucho is being pushed. Lima will soon be united with Ancon, its best bathing beach, by a motor road. The close of the year will see many new asphalt blocks in Lima.

Up to the present time efforts in Peru have largely been directed to marketing new motor vehicles, but now a new problem comes to the front, that of maintaining in running condition and profitable the automobiles and trucks already here. As there are now five times as many automobiles in the country as can possibly be sold in a year, the problem of servicing the cars already here is one of no secondary importance.

HARVESTER ENGINEERS MOVED

SPRINGFIELD, OHIO, Oct. 8 — Engineers at the Akron plant of the International Harvester Co., who have been designing motor trucks for the Springfield works, have been moved to the local plant. There are in charge of N. G. Anderson, chief engineer. As a result of this move all department heads and engineers having anything to do with the Springfield works are stationed here.